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## JALAP AND POWDERED JALAP.

By Virgil Coblentz, Ph.G.

*From an Inaugural Essay presented to the Philadelphia College of Pharmacy.*

Commercial air-dry jalap of fair quality was examined.

*1. Moisture.*—5 grams of jalap, heated to 100°C. until it ceased to lose weight, lost ·388 gm. = 7·76 per cent.

*2. Ash.*—5 grams of jalap, on incineration, yielded ·5508 gm. = 11·016 per cent. of ash, of which 55·29 per cent. was soluble in water, 38·23 per cent. soluble in hydrochloric acid, 8·82 per cent. soluble in soda and 17·64 per cent. insoluble. The ash consisted of sulphates, phosphates, chlorides and carbonates of potassium, sodium, calcium and magnesium, and silica.

*3. Benzol Extract.*—50 grams of jalap, exhausted with pure benzol, yielded 9·331 gm. = 18·62 per cent. of extract of a yellowish-brown color, a nauseous smoky odor and sweetish acrid taste; dissolved in absolute alcohol and the solution precipitated by water gave 8·035 gm. = 16·07 per cent. of resin and, on evaporation of the aqueous liquid, ·648 gm. of yellowish-brown sweetish extract, which contained sugar, was free from tannin and yielded a yellowish precipitate with basic lead acetate. The resin was ascertained to be insoluble in oil of turpentine, sparingly soluble in petroleum naphtha and methylic alcohol, soluble in alcohol, amylic alcohol, chloroform and acetic acid. On being repeatedly dissolved in alcohol and precipitated in water, it became white and almost inodorous.

*4. Resin.*—On exhausting the resin with strong ether and evaporating, ·41139 gm. = 5·12 per cent. of a soft resinous mass was obtained, having a greenish-brown color, a disagreeable acrid taste and the peculiar odor of jalap; its alcoholic solution has an acid reaction; its solution in caustic alkali is red-brown and is precipitated by hydrochloric acid.

The resin insoluble in ether weighed 7·624 gm. = 94·88 per cent. Its alcoholic solution is neutral to litmus; its solution in potassa is bright yellow and is not disturbed on the addition of an acid. With nitric acid the resin evolves nitrous oxide and is colored bright yellow. Among the products of oxidation oxalic acid is found.

*5. Alcoholic Extract.*—The drug exhausted with benzol was treated with 80 per cent. alcohol; on evaporating the tincture 5·508 gm. = 11·016 per cent. of a red-brown tough extract was obtained; of this ·912 gm. = 16·5 per cent. was soluble in absolute alcohol and this portion had an acid reaction, reduced Fehling's solution, was free from tannin and was partly precipitated by subacetate of lead.

The portion insoluble in absolute alcohol was entirely soluble in water and was partly precipitated by basic lead acetate.

*6. Cold Water Extract.*—Cold water took up from the drug 2·59 gm. = 5·18 per cent. of extract, consisting of gum and coloring matter.

*7. Starch* was estimated by boiling the root with water, and this extract for a long time with dilute acid and calculating from the glucose; the amount was 3·6 gm. = 7·2 per cent.

*8. Alkali Extract.*—Boiling dilute soda solution dissolved 1·29 gm. = 2·58 per cent. of albuminous and coloring matters.

*Powdered Jalap.*—Twelve samples were assayed for the resin, which was found to vary from 3·8 to 16·2 per cent., the average being 8·1 per cent.; this resin was not further examined.

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## THE ROOT OF STILLINGIA SYLVATICA.

By John H. Harmanson, Ph.G.

*Abstract from an Inaugural Essay.*

The cold infusion of Stillingia is of a pale reddish color, possesses but slightly the odor and taste of the root, and yields precipitates with gelatin and ferric chloride, bluish-black with the latter; it is not disturbed by reagents for alkaloids, contains sugar, and the extract obtained on evaporation was partially soluble in alcohol.

The decoction, on the addition of iodine, became blue, but the color quickly disappeared at first. Stillingia root which had been completely exhausted with alcohol and ether showed the same behavior, but the decoction made from root which had been previously macerated in alcohol acidulated with sulphuric acid, gave a permanent blue color on

adding a minute amount of iodine. The property of decolorizing iodine is therefore regarded to be not due to tannin, and the principle as it exists in the root was found to be insoluble in alcohol and ether, slightly soluble in cold water, readily soluble in boiling water and destroyed by acids, gradually in the cold and rapidly on heating.

The ethereal tincture of the recently dried root left, on evaporation, a brownish extract of a very thick oily consistence, of a strong odor and of a persistently pungent and acrid taste; it was insoluble in water but quite soluble in stronger alcohol. The ethereal extract obtained from powder which had been exposed to the air for more than two years was considerably darker, thicker and but slightly pungent and acrid.

The tincture contains an oily and a resinous matter, the latter being soluble in ether and in alkalies and from the latter solution reprecipitated by acids. Rendered alkaline with potassa and distilled, an alkaline liquid was obtained which, on being neutralized with sulphuric acid and evaporated, yielded yellow crystals, and these by treatment with charcoal and recrystallization became white and odorless. The crystals are stated to yield precipitates with phosphomolybdic acid, tannin and Mayer's test, but not with chloride of gold.

On distilling the root with water, an opalescent distillate was obtained but no volatile oil. The root yielded about 5 per cent. of ash.

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**Guacamacha** is a South American tree, related to the oleander, emitting, in the rainy season, when wounded, a very active milk juice. The activity resides in an alkaloid, which is chiefly contained in the bark, and to a certain extent in the wood, and is soluble in water, little soluble in absolute alcohol, and insoluble in ether and chloroform. The aqueous extract is an effective preparation. Dr. Schiffer states that it will probably prove a suitable remedy in diseases with increased action of the motor apparatus, and as a hypnotic. In Frerichs' clinic, a young man suffering from spasms had 0·010 gram injected, and after the stage of incubation, lasting nearly ¾ hour, in the daytime, slept soundly for three hours, and awoke without feeling the least disturbance; respiration and circulation were unaltered.—*Phar. Ztg.*, 1882, No. 45, from *D. Med. Ztg.*

## ASTRINGENT DRUGS.

By Chas. F. Kramer, Ph.G.

*From an Inaugural Essay.*

For determining the amount of tannin, aluminated gelatin solution was employed; since, however, Müller's solution ("Amer. Jour. Phar.," 1859, p. 427; 1861, p. 164) proved to be too thick for convenient use, a solution of about one-third the strength proposed by him was used and standardized with tannin.

The author does not state the strength of the infusions or decoctions used, or whether the results were verified by check experiments. Most of the figures agree well with the results obtained by H. K. Bowman ("Am. Jour. Phar.," 1869, p. 193). The percentage of tannin thus determined was as follows:

| | | | |
|---|---|---|---|
| Brayera, | 24·40 | Hæmatoxylon, | 3·50 |
| Caryophyllus, | 13·00 | Heuchera, | 20·00 |
| Catechu, | 40·33 | Humulus, | 4·00 |
| Chimaphila, | 4·00 | Krameria, | 22·00 |
| Cinnamomum, | 9·36 | Pimenta, | 1·69 |
| Cornus florida, | 3·00 | Prunus Virginiana, | 3·42 |
| Galla, | 66·88 | Quercus alba, | 8·34 |
| Geranium, | 17·33 | Rubus, | 10·20 |
| Geum, | 3·00 | Sassafras, | 6·00 |
| Granati Fructus Cortex, | 28·00 | Tormentilla, | 17·00 |
| Granati Radicis Cortex, | 22·00 | Valeriana, | 1·54 |

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## EMULSION OF CODLIVER OIL WITH PHOSPHATE OF CALCIUM.

By Evan B. Merriam, Ph.G.

*From an Inaugural Essay.*

Made by the following process, this preparation will retain the insoluble calcium phosphate in suspension for a long time:

| | |
|---|---|
| Take of well-washed phosphate of calcium, dry and in fine powder, | grs. clx |
| Pure muriatic acid, a sufficient quantity, about | f℥v |
| Water of ammonia, a sufficient quantity, about | f℥iiss |
| Best codliver oil, | f℥viii |
| Pure glycerin, | f℥i |
| Gum arabic, in powder, | ℥i |
| Oil of nutmeg, | ♏v |
| Oil of lemon, | ♏x |
| Oil of gaultheria, | ♏v |
| Water, sufficient to make | f℥xvi |

Dissolve the phosphate of calcium in the muriatic acid, dilute the solution with ten times its volume of water, and add the water of ammonia, also diluted with water, until it ceases to produce a white precipitate. Throw the whole on a filter, and wash as long as the washings render a solution of nitrate of silver turbid. To this precipitate, contained in a capsule, add the glycerin, and apply a gentle heat, until the mass is well diffused and the mixture becomes nearly clear; then remove, and mix it with the mucilage, and make the emulsion in the usual way.

The flavor of oil of bitter almonds, from its constant employment in this class of preparations, is repulsive to many persons, and the above mixture of oils is offered as a substitute therefor.

Preparations are sometimes sold under the names of codliver oil, lime, and iron and codliver oil and wild cherry. The former can be made by adding two grains of pyrophosphate of iron to each teaspoonful of the above emulsion; the latter, by shaking two ounces of the fluid extract of wild cherry bark with fourteen ounces of simple emulsion of codliver oil.

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## THE FORENSIC-CHEMICAL DETERMINATION OF GELSEMINE IN ANIMAL LIQUIDS AND TISSUES.

By Edward Schwarz, M.D.

Abstract from an Inaugural Essay presented to the University of Dorpat, and communicated by the Author.

The author briefly reviews the investigations of H. Kollock ("Amer. Jour. Phar.," 1855, p. 263), C. L. Eberle (*Ibid.*, 1869, p. 35), Professor Wormley (*Ibid.*, 1870, p. 1), and Dr. C. A. Robbins (see *Ibid.*, 1876, p. 191). Professor Wormley's more recent investigation (*Ibid.*, 1877, p. 150) appears to have escaped his attention. The method recommended by Dragendorff ("Jahresbericht für Pharmacie," 1878, p. 640) was used for the preparation of the two important principles; gelsemic acid was obtained from the acidulated solution by agitation with chloroform, and gelsemine by agitating the liquid rendered alkaline by ammonia with benzol.

The chloroform solution, on evaporation, left a crystalline residue, which dissolved partly in water, with a yellow color, and showed a strong blue fluorescence. The small insoluble portion was dissolved in alcohol. Both solutions, placed over sulphuric acid, yielded crystals;

those from the watery liquid were light yellow-brown fine needles, being comb-like, attached to a larger prismatic crystal. These crystals showed all the reactions of æsculin except that they acquired a greenish color with ferric chloride, due probably to the presence of æsculetin. The crystals from the alcoholic solution emanated from a central point, and were branching in a tree-like manner; in the deeper part of the vessel several thornapple-like aggregations of crystals were observed. The amount obtained from 50 grams of the root was so small that accurate investigations could not be made; moreover, the presence of æsculin seemed to interfere with the reactions of this substance.

The benzol solution yielded, on evaporation, a dark brown, resinous mass, which was dissolved in dilute sulphuric acid and precipitated with concentrated soda solution; the precipitate collected, washed and dried formed a white powder, which caked together in boiling water to a brown mass, and showed the behavior of gelsemine. The filtrate, agitated with chloroform, yielded a pale, rose-colored substance, having the same behavior. The total yield weighed between 0·2 and 0·3 gm.

Another experiment made with the powdered root proved that the acidulated liquid yields to amylic alcohol considerable æsculetin, recognizable by the dark green color with ferric salts, and by the blue-green fluorescence in aqueous solution, which is destroyed by potassa. The residue also gave distinct alkaloidal reactions with bismuth-potassium iodide, picric acid, and iodine.

The following tests were made with æsculin and æsculetin, not with the similar principle obtained from gelsemium.

To the well-known reaction of æsculin and æsculetin must be added their behavior to *Langley-Koehler's test*, which is very similar to that of picrotoxin,[1] except that the color with æsculin is deeper brown, and with æsculetin, red-brown. Æsculin and brucine have also a similar reaction, namely, to *chlorine water* (red color). *Gold chloride* is reduced by æsculin, the color depending on the concentration and temperature of the liquid; it yields, with aqueous solutions of æsculetin, a raspberry-red color. *Potassium ferridcyanide* does not affect æsculin, but, on boiling, colors æsculetin solutions red-brown. The same reagent, *with ferric chloride*, gives with both an intense green-blue

[1] Mix powdered picrotoxin with 3 or 5 parts of pure saltpetre; add 1 or 2 drops of strong sulphuric acid; mix, and add rapidly soda solution to strong alkaline reaction, when the mixture becomes transiently brick-red.
EDITOR.

color, and gradually causes a blue precipitate. Solution of *copper sulphate* remains blue with æsculin, but turns green with æsculetin.

A solution of 0·5 gm. æsculin in 50 cc. water was given to a cat without producing abnormal symptoms; the acid urine let after two hours had a strong fluorescence. Another cat took 0·1 gm. æsculin. The aqueous solution of the fæces of the first and second day was strongly fluorescent; from the third day, æsculin could not be detected. The urine was likewise fluorescent on three days, but not on the fourth day until after it was rendered alkaline; chloroform extracted from it æsculin.

Subcutaneous injections of æsculin, ·0066 and ·0003 gm., were made to two frogs, and these were afterwards placed in distilled water, which for nine days became fluorescent.

The author concludes, from these experiments, that

1. Æsculin is without decided action upon the animal organism.
2. It rapidly enters the second ways from the stomach and intestines.
3. It is not decomposed within the body, and
4. Is rapidly excreted through the kidneys.
5. A prolonged time is required for its complete excretion.
6. Powdered æsculin is partly eliminated with the fæces, probably owing to its sparing solubility.

The "animal quinine" obtained by Bence Jones from the kidneys of higher animals, which, however, has not been observed by Dragendorff, is not fluorescent in alkaline solutions.

The experiments with the alkaloid were made with such prepared by the author, and with pure gelsemine made by Merck. If merely moistened with sulphuric acid and then brought in contact with a minute drop of solution of potassium bichromate, the color produced and the changes closely resemble those observed with strychnine; but if as suggested, by Robbins, the alkaloids are dissolved in strong sulphuric acid, and the bichromate added to the solution, gelsemine yields a cherry-red color, changing to dingy gray-brown, and green spots or streaks are not unfrequently observed, due to absorption of moisture. Strychnine becomes violet-blue, then cherry-red, finally brick-red, the latter color lasting more than a day. Quebrachine becomes slowly violet-blue, and, after a longer time, acquires a red tint; but, if dissolved in trihydrated sulphuric acid, no reaction is observed with potassium bichromate, as is also the case with curarine; but under the same

condition the cherry-red color of gelsemine changes to an intense green or bluish-green.

On substituting manganese binoxide for the bichromate, almost identical results are obtained; but using concentrated sulphuric acid, the colorations of gelsemine, and particularly of quebrachine, are much darker and handsomer. With the bihydrated acid, quebrachine gives only a slight violet color; in the presence of trihydrate the dark green color of gelsemine appears slowly, and, with a greater dilution of the acid, the blue-violet color of strychnine in the beginning is more and more replaced by cherry-red.

The same reactions, made with ceric oxide, yield lighter and less intense colorations, the green from gelsemine having a bluish tint.

The weakest colorations are produced by lead peroxide only in presence of a trace of nitric acid; the tint from gelsemine is grass-green.

The reaction best adapted for gelsemine is sulphuric trihydrate and one of the four reagents, when the final color by gelsemine is green, and by strychnine, brick-red.

Concentrated sulphuric acid dissolves gelsemine with a yellow-brown color; quebrachine, similar; strychnine, colorless.

Sulphuric acid containing iron shows no reaction with gelsemine and strychnine; a blue-violet color with quebrachine.

Froehde's reagent: With gelsemine, roe-brown to red-brown, gradually yellowish-green (a very similar reaction was observed by Graebner with ptomaines); strychnine, no change; geissospermine and quebrachine, blue.

Selen-sulphuric acid, with gelsemine, no reaction.

Sugar and sulphuric acid: Gelsemine, cherry-red; but fats, biliary acids, aconitine, codeine, and delphinidine give the same color; strychnine, no red color; quebrachine, intense cherry-red.

Brouardel-Boutmy's reagent (potassium ferridcyanide and ferric chloride): Gelsemine and quebrachine, intensely green; strychnine and aspidospermine, no reaction. Ptomaines obtained from the stomach and intestines, no reaction; but if isolated from the liver, kidneys, etc., by agitation of the alkaline liquid with benzol or chloroform, a slight green color is produced, and the older the corpse the more frequently are such ptomaines obtained.

Chlorine water to acid solution: Gelsemine yields yellowish turbidity and slight fluorescence; after a while a yellowish-white precipitate, which is produced yet in solutions of 1 in 1,000 and is dark-

colored from impure alkaloid; the supernatant liquid is not fluorescent. Strychnine has a very similar behavior; likewise, though less delicate, quebrachine.

Boiling with perchloric acid: Gelsemine, slightly yellow; strychnine, red.

Sulphuric bihydrate, with fragment of potassium chlorate and boiling: Gelsemine and aspidospermine, clear; strychnine, red-brown to black-brown solution.

Selmi's reagent (iodic acid suspended in sulphuric acid): Gelsemine and strychnine, rose-colored; brucine and aspidospermine, brick-red; quebrachine, dark violet. On warming, the color becomes darker, and finally disappears.

Potassium-bismuth iodide gives a red-brown precipitate with ·000025 gm. gelsemine; phosphomolybdic acid, a precipitate with the same amount. Precipitates with ·00005 gm. gelsemine are caused by iodine, potassio-mercuric iodide, bromine (yellow), phosphotungstic acid (white), and tannin; with ·0001 gm. gelsemine, by potassio-cadmic iodide (white) and picric acid (yellow), and a turbidity merely by the chlorides of gold and mercury.

The author then refers to the physiological experiments made with gelsemium by Professor Ott (1875) and Dr. Moritz (1878), with whose results his own observations agree. He details his experiments for the detection of æsculin (gelsemic acid) and gelsemine, made with food, blood, and urine, both fresh and putrid, and with poisoned cats, and closes with the following deductions:

After poisoning with gelsemium in lethal doses, æsculin and gelsemine may be isolated by Dragendorff's method (removal of fat by petroleum benzin, extraction of æsculin from the acid solution by chloroform, and extraction of gelsemine from the alkaline liquid by benzol), and both may be recognized as such.

Æsculin may be found in all organs, and gelsemine in the stomach, intestines, blood, and liver.

After the subcutaneous application of rapidly fatal doses of gelsemine, the alkaloid can be detected in the corpse only in mere traces, and not with certainty; it is best to search for it in the liver.

Putrefaction, accompanied by alkaline reaction, does not alter gelsemine, but decomposes æsculin; both principles are not altered if the reaction remains acid.

The poisonous action of gelsemium does not depend on æsculin.

Gelsemine and æsculin rapidly pass from the stomach and intestines into the blood, and are excreted through the urine. The resorption is also rapid on subcutaneous application.

For the complete excretion of æsculin through the urine a longer time is required, so that after a single dose it may be recognized in the urine for several days.

If, in forensic analysis, gelsemine is supposed to have been found, the presence of æsculin should be determined for deciding the question whether gelsemine alone or gelsemium root had been administered.

Under certain conditions gelsemine shows the same reaction with sulphuric acid and potassium bichromate as strychnine. For distinguishing it from the latter, the following properties are useful:

I. The reactions. 1. To concentrated sulphuric acid; 2. To sulphuric trihydrate and potassium bichromate (or ceric oxide or peroxide of manganese or of lead); 3. To Brouardel-Boutmy's reagent; 4. To sugar and concentrated sulphuric acid.

II. The action upon the animal body; and

III. Its association in the root with æsculin.

It is distinguished from quebrachine, 1. By not being extracted by chloroform from acid solutions by the reactions; 2. With sulphuric acid and potassium trihydrate; 3. With Froehde's reagent; and 4. With sulphuric acid containing iron; and 5. By the absence of æsculin from quebracho bark.

The mode of isolation, the reaction with Froehde's reagent, and the association with æsculin in the drug serve to distinguish gelsemine from geissospermine.

For distinguishing it from aniline and curarine consult Dragendorff, "Ermittelung der Gifte." Relations analogous to those existing between strychnine on the one side and curarine and aniline on the other are likewise observed between gelsemine and the last two alkaloids. J. M. M.

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**Solution of Morphine in Oil** is proposed by Larochette to be prepared by dissolving 5 parts of the crystallized alkaloid in 1,000 parts of expressed oil of almond. Since dehydrated morphine is soluble in 125 parts of the hot oil such a concentrated solution may be kept on hand and properly diluted when wanted for medicinal use.—*Jour. Phar. Als.-Lorr.*, 1882, p. 105; *Bull. Phar. Lyon.*

## CHEMICAL NOTES.

By Prof. Samuel P. Sadtler, Ph.D.

Inorganic Chemistry.—*On Pernitric Acid.*—Hautefeuille and Chappuis, who announced the fact, some time ago, that when the electric spark is passed through a mixture of nitrogen tetroxide and oxygen, the red color of the mixture disappears and a colorless gas remains, have still further investigated the matter. They find that the electric spark will develop the same compound from a dry mixture of oxygen and nitrogen gases. That the new compound is not nitric oxide, $N_2O_5$, is recognized by the fact that it cannot be gotten crystallized or in the solid form at all, as nitric oxide readily can be. They find, moreover, that this new compound forms up to a maximum amount from the action of the spark upon the mixture of gases, and after that the combination just made is broken up and nitrogen tetroxide and free oxygen remain. This maximum amount is dependent upon temperature, the lower the temperature the larger being the amount. They do not, as yet, propose any formula for it.—*Comptes Rendus*, 94, 1111.

*On the Rare Metals of the Cerium and Yttrium Groups.*—Roscoe has recently made a study of the mixture of rare earths from samarskite, with a view of determining whether De la Fontaine's philippium has any real existence or not. De la Fontaine had given, as one characteristic of the supposed element the fact that it formed a well-crystallized formiate distinct from that of terbium or yttrium. Roscoe finds that a mixture of the formiates of terbium and yttrium can crystallize in the single forms described as characteristic of philippium. He comes to the same conclusion with regard to the non-existence of philippium from a spectroscopic view of the several oxides, and from the standpoint of Mendelejeff's periodic system of the elements shows that an element is not to be expected in the position of philippium, and with the properties acribed to it.—*Ber. Chem. Ges.*, xv, p. 1274.

P. T. Clève publishes a note on didymium and a supposed new element which accompanies it. In purifying didymium preparations, he got fractions showing a variation in spectral lines, and giving for the atomic weight of didymium values varying from 146 to 142. The first of these he considers as pure didymium, and the last to be contaminated with an element yet to be isolated, which he designates provisionally as Di$\beta$.—*Chem. News*, June 23, p. 273.

*Processes for Direct Coppering of Castings of Iron and Steel.*—F. Weil gives an account of the processes devised by him for the direct coppering of castings of iron and steel, without the use of any intermediate coating of plumbago or other material upon the surface of the casting.

The deposit of copper by this method is so homogeneous, and so faithfully reproduces the most delicate details of ornamentation, as to give to articles so coppered the artistic value of bronze, and at the same time is so firmly adherent that castings coppered by this process have remained exposed to the weather for ten years without requiring any retouching. The alkaline organic baths used in the process present several advantages over the ordinary alkaline baths used in electrotyping. The cyanides, which are both injurious to the health of the workmen and expensive, are replaced by organic acids, or by glycerin, both of which are cheap and have the advantage of not being decomposed in the operation. Thus the baths require no renewal of organic material, and act continuously, provided the necessary amount of oxide of copper is added from time to time. Finally the well-known property of alkaline organic solutions of dissolving oxide of iron easily and rapidly, without attacking the metal itself, always renders the cleansing of the castings perfect, as the bath finishes the cleansing of articles before coppering them.

The process is carried on in three different ways, according to local conditions and the different applications of the articles to be coppered. The first method consists in plunging the articles in the bath in contact with strips of zinc. The coppering begins immediately, and according to the alkalinity of the bath and the destination of the articles to be coppered, requires a variable time, from a few minutes to several hours.

The second process, which has been employed with great success for coppering the street lamps of a large city, consists in placing in the vessel containing the bath and the objects to be plated porous jars, filled with a strong solution of caustic soda, in which are placed plates of zinc, connected with the articles in the bath by a coarse copper wire. The time required for depositing a moderately-thick coating of copper, such as required by candelabra, etc., is very short.

The third process consists in the use of the same baths as in the first and second processes, in conjunction with a dynamo-electrical machine.

The baths, as has been said, only require the addition of a certain

amount of oxide of copper from time to time, and by a simple method of titration, also devised by Mr. Weil, the exact amount of copper oxide to be added can be readily and quickly determined.

These processes can be also applied to the deposition of all metals, such as nickel, cobalt, antimony, tin, etc., upon castings of iron and other metals.—*Comptes Rendus*, 93, 1018.

ORGANIC CHEMISTRY.—*On the Crystallization of Anhydrous Grape-sugar.*—Dr. Arno Behr describes the method of obtaining well-crystallized anhydrous glucose from aqueous solutions. Hitherto glucose had been obtained anhydrous only from alcoholic solutions, either solutions of ordinary alcohol, or, according to Soxhlet's recently-patented method, from methylic alcohol. From aqueous solutions had been obtained only the hydrate in small and laminated crystals, which were very hard to free from the mother liquor. Behr found that upon putting a crystal of anhydride in an aqueous solution, instead of its taking up water of hydration, there separated out over night a mass of hard, sharply-crystallized anhydrous glucose, which was readily purified from syrup in a centrifugal. The solution from which this crystallization took place contained 18 per cent. water, and of 100 parts dried material 87·5 were pure glucose. Behr found, moreover, that it was not even necessary to start the crystallization by a fragment of solid glucose, but that for concentrated solutions and moderately elevated temperatures, the crystallization of anhydride is the rule and not the exception. The pure product gotten this way resembles cane-sugar in many ways, and can be used for many of the applications of the latter. Its sweetness is to that of cane-sugar in about the ratio of 1 to $1\frac{3}{5}$.—*Ber. Chem. Ges.*, xv, p. 1104.

*Artificial Piperine.*—Rügheimer describes the successful attempt to build up the alkaloid piperine by the same methods as those adopted by Ladenburg in the preparation of artificial atropine. The action of phosphorus pentachloride upon piperic acid yielded the acid chloride, which was then made to act upon piperidine. The result of the reaction, freed from side products, was piperine, which after purification by recrystallization from benzol and ligroin fused at 127 to 128°C., and gave figures on analysis closely according with those demanded by the formula. Natural piperine, according to Rügheimer's observation, fuses at 128 to 129.5°C. In some text-books the fusing point of piperine is erroneously given on Pelletier's authority at 100 to 110°C.

The author promises still further experiments to establish the identity of the natural and the artificial alkaloids.—*Ibid.*, p. 1390.

*On some New Compounds of Hæmateïn and Brazileïn.*—Hummel and Perkin have studied purified hæmateïn and brazileïn, and have obtained some new coloring derivatives from them by the action of sulphuric, hydrochloric, and hydrobromic acids. They first obtained pure hæmateïn in glittering crystals of the formula $C_{16}H_{12}O_6$. They found it sparingly soluble in water, alcohol, ether and acetic acid; readily soluble in alkalies. It is destroyed by hot sulphuric acid, but dissolves readily in cold concentrated sulphuric acid, producing a dark reddish-brown solution. By adding hot glacial acetic acid very gradually to this solution, until it is diluted to two or three times its bulk, an orange crystalline precipitate is thrown down. This has the formula $C_{16}H_{12}O_6SO_3$, and is called by the authors sulphate of hæmatyl. By the action of hydrochloric acid, in sealed tubes, on hæmateïn, a body was prepared of the formula $C_{16}H_{11}O_5Cl$, crystallizing in scarlet needles. A similar compound, containing bromine, was prepared by the action of hydrobromic acid.

Brazileïn, as purified and dried at 100°C., had the formula $C_{16}H_{12}O_5$, $H_2O$, and yielded similar compounds by the action of sulphuric, hydrochloric, and hydrobromic acids. The tinctorial power of these new compounds is much greater than that of the original hæmateïn and brazileïn, and the colors are much faster. The authors consider that hæmateïn probably belongs to the class of phthaleïns.—*Chem. News*, June 23, 1882, p. 274.

*On the Composition of Turmeric and some of its Derivatives.*—C. Loring Jackson and A. G. Menke have made a careful study of curcumin, the yellow coloring matter of turmeric, and have established its formula by making a number of derivatives. They find for the preparation of curcumin the following to be the best method: The turmeric oil is first removed from the ground root by treatment with ligroin; then the curcumin, mixed with a large quantity of resin, is extracted with ether, and finally purified by crystallization with alcohol. The ligroin extract yielded on evaporation a dark yellow oil, amounting on the average to 11 per cent. of the weight of the root. The curcumin was purified by recrystallization until its melting point was 178°C. The average yield of this pure curcumin was 0·3 per cent. They give the formula $C_{14}H_{14}O_4$ to the compound, which formula seems borne out by the analysis of its derivatives. Of these, they pre-

pared the monopotassic and the dipotassic salt, the monoparabrombenzyl-ester, and several products of oxidation. With strong oxidizing agents, like sulphuric acid and potassium dichromate, they got only acetic acid and carbon dioxide, and with nitric acid they got chiefly oxalic acid. With mild oxidizing agents, like potassium permanganate and an alkaline hydrate, they obtained vanillin, melting at 79°C., when purified, and in another case ethylvanillic acid. They consider curcumin as a phenol-carboxylic acid, that is, a compound containing the phenol group OH and the group COOH, carboxyl, characteristic of organic acids.—*Amer. Chem. Jour.*, vol. iv, p. 77.

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## ANALYTICAL RESEARCHES AND INVESTIGATIONS.

COLLATED BY PROF. FREDERICK B. POWER, PH.D.

*Examination of Butter for the Determination of Foreign Fats* (oleomargarin).—Fifteen grams of the butter are introduced into a capsule and melted on the water-bath; after the water and impurities have deposited, the butter is carefully decanted and filtered upon a funnel placed with a small beaker in an oven, or with a funnel surrounded with hot water and, after filtration, the limpid butter refrigerated. The beaker is then weighed and by means of a glass rod three or four grams of the butter are removed and introduced into a capsule of twelve centimeters diameter, with the rod and butter adhering thereto; the beaker is then again weighed and the difference represents the weight of the butter; fifty cubic centimeters of alcohol and from one to two grams of pure potassa are then brought in the capsule, and the liquid heated upon the water-bath until when water is added, little by little, it produces no turbidity, which is generally attained by heating for about five minutes. If, on the sudden addition of a large quantity of water, a precipitation of flocks of fat are produced, it will be necessary to commence the operation anew.

The solution is evaporated on the water-bath to a syrupy consistence, the residue dissolved in one hundred to one hundred and fifty cubic centimeters of water, and the solution made strongly acid by dilute sulphuric acid; the whole is then heated on the water-bath for about half an hour, until the separation of the acids has become quite complete, and the aqueous liquid is absolutely limpid. A filter, ten to twelve centimeters in diameter, of paper sufficiently thick to admit of hot water passing through only drop by drop, is dried at 100°C. and weighed;

it is half filled with water and the contents of the capsule then poured upon it, being careful that the niveau of the liquid never exceeds two-thirds of the height of the filter. The capsule and the rod are then washed with hot water, which removes perfectly the fatty acids, after which the washing of these acids is continued on the filter until the washings have no longer an acid reaction; it requires about $\frac{3}{4}$ liter of water to attain this result, but no risk is involved of the fatty acids passing through the wet filter. After washing, the funnel is placed in cold water, and as soon as the acids have solidified the filter is dried at 100°C. in a tared beaker until the weight remains constant, which is attained in about two hours. In this way the weight of the non-volatile fatty acids, insoluble in water, is determined.

Butter yields by this procedure from 86·5 to 87·5 and sometimes 88 per cent. of fatty acids. The animal fats which serve for adulteration contain 95·5 per cent., consequently an excess of 95·5—87·5=8 per cent. by reason of the complete absence of soluble or volatile fatty acids. If, then, in analyzing a butter, it is found for the amount of acids a number exceeding 87·5, for example 91 per cent., being an excess of 3·5, it must be concluded that the butter is adulterated, and that it has received, as a minimum. an addition of $\frac{3 \cdot 5}{8} + 100 = 43$ per cent of foreign fat. (See "Amer. Jour. Phar.," 1878, p. 257, 258.)

*Determination of the Water.*—Ten grams of butter are dissolved in thirty cubic centimeters of petroleum, having a specific gravity of 0·69 ann boiling at 80 to 110°C. The liquid which unites at the bottom is collected by the aid of a separating funnel and measured in a tube divided into tenths of a cubic centimeter; each division indicates 1 per cent. of water and of impurities; good butter contains from 10 to 14 per cent. of water; in this way one may recognize also the presence of substances slightly soluble in water, added for the purpose of adulteration, and the salt mixed with the butter for its preservation. The separated water contains also a portion of the dissolved foreign salts: alum, borax, soluble glass, etc.

The butter may also be dried at 110°C. and the product extracted by a light petroleum, boiling below 100°C. The residue consists of salt, the casein and lactose, the latter of which may be estimated by Fehling's solution. Butter is colored with curcuma or victoria yellow, with chromate of lead, yellow coralline, or the nitrous derivatives of saffron and annotto. In order to recognize the presence of these coloring matters it is necessary to make comparative reactions with the

butter to be examined with pure butter, and with butter to which the different coloring matters have been added.

The presence of salicylic acid may be detected by agitating the butter with warm salt water and adding to this liquid a drop of ferric chloride, when a violet coloration will be produced.—*Bull. de la Soc. de Pharm. de Bordeaux*, 1882, pp. 139–141.

*On Hydroquinidine.* By. Ç. Forst and Chr. Boehringer.—By the oxidation of quinidine by potassium permanganate, in a solution which is maintained acid, the authors have obtained a product of oxidation which is crystallizable from alcohol in small needles, while at the same time formic acid is produced, and a base crystallizable in prismatic needles, soluble in alcohol, and rapidly efflorescing on exposure to the air. The authors have determined simply the water of crystallization of this base, which they regard as *hydroquinidine*, $C_{20}H_{26}N_2O_2+2\frac{1}{2}H_2O$, and as produced during oxidation.

From its solution in ether this base is deposited in thick tables, which are apparently rhombic; its alcoholic solution has an alkaline reaction. Hydroquinidine is dextrogyrate and to about the same extent as quinidine; its fusing point is also about the same, being 166 to 167°C. It yields with chlorine and ammonia the reaction of quinine and quinidine, and its solution in dilute sulphuric acid presents a blue fluorescence; its salts crystallize readily. The *chloroplatinate*, $C_{20}H_{26}N_2O_2(HCl)_2PtCl_4+2H_2O$, is deposited on cooling in short orange-colored needles. The *hydriodate* crystallizes in anhydrous striated needles, slightly soluble in cold water, and containing, according to the estimation of the iodine, $C_{20}H_{26}N_2O_2HI$. The *sulphate*, $(C_{20}H_{26}N_2O_2)_2H_2SO_4+12H_2O$, of which only the water of crystallization has been determined, forms voluminous many-faced crystals. The hydrochlorate forms short needles which are sparingly soluble in cold water.—*Ibid.*, p. 141; *from Ber. der Deutsch. Ch. Ges.*, xiv., p. 1954.

*A Reaction of Morphine.* By F. Tattersall ("Chem. News," 41, p. 63), and *Reactions of Morphine, Codeine, and Atropine.* By Diosc. Vitali ("Ber. der Deutsch. Ch. Ges.," 14, p. 582).—Tattersall has ascertained that morphine, when treated with sulphuric acid and arseniate of sodium, produces a violet color, which, by the action of heat, changes to green. Vitali, in order to effect this reaction, dissolves the morphine in concentrated sulphuric acid, adds the arseniate of sodium, and heats; a bluish-violet coloration is first observed and the liquid afterwards becomes green; by the addition of water to the latter, a

rose-colored solution is first obtained, which afterward becomes blue, and on the addition of ammonia in excess the green color is reproduced. The solution of morphine in sulphuric acid, on the addition of a little sulphide of sodium dissolved in water and heated, produces a rose-color which changes to violet and finally to a dark green; the same sulphuric acid solution of morphine with an alkaline sulphide, mixed with sulphuric acid to which chlorate of potassium has been previously added, produces a green and then a violet color, which changes to yellow on the addition of an excess of chlorate; codeine produces analogous reactions.

If to atropine the sulphuric acid solution of chlorate of potassium be added, drop by drop, and the vessel containing the mixture be agitated, there are developed greenish-blue stripes, and finally the liquid becomes slightly green.—*Jour. de Pharm. et de Chim.*, v, 1882, p. 633.

*On the Volatile Oil of Sandal Wood.* By P. Chapoteaut.—The volatile oil of sandal wood, which was formerly employed exclusively in the art of perfumery, has since found a therapeutic application by the replacement in part, if not completely, of balsam of copaiba.

It is obtained by distillation with the vapor of water from sandal wood (Santalum album, of Bombay). The yield of volatile oil from 100 kilos of wood varies from 1 kilo 250 grams to 2 kilos 800 grams, according to the more or less ancient origin of the wood.

The oil is a somewhat thickish liquid, having the specific gravity 0·945 at 15°C.; it boils between 300 and 340°C., and consists almost entirely of two oxygenated oils, having the composition $C_{15}H_{24}O$ and $C_{15}H_{26}O$, of which the first boils at about 300°C., the latter at about 310°C. The first is contained in the oil in much larger quantity than the second.

*Action of dehydrating agents.*—Phosphoric anhydride deprives the oil of two molecules of water, forming the hydrocarbons $C_{15}H_{22}$ and $C_{15}H_{24}$, of which the former boils at 245°C., the latter at about 260°C. The volatile oil of cedar, deprived of its oxygenated portion, possesses exactly the composition of the hydrocarbon, $C_{15}H_{22}$, and boils at the same temperature; it is thus probable that the two products are identical. As to the hydrocarbon, $C_{15}H_{24}$, it is isomeric, or identical with the oil of copaiba.

*Action of heat.*—By slow distillation the oil of sandal yields products boiling below 250°C. and above 350°C., at the same time form-

ing water and hydrogen, but the transformation is incomplete. By operating in a closed vessel, at 310°C., the reactions are more complete; the results obtained may be expressed by the two following equations, $4C_{15}H_{24}O = C_{20}H_{30}O + C_{40}H_{62}O_3 + 4H$, and $C_{40}H_{62}O_3 = C_{40}H_{60}O_2 + H_2O$.

The oil, $C_{20}H_{30}O$, boils at 240°C. Phosphoric anhydride transforms it into a hydrocarbon, $C_{10}H_{14}$, boiling at 175 to 180°C., and having the odor of thyme (cymene).

The product, $C_{40}H_{62}O_3$, is a thick liquid, distilling at about 340°C.

The third product, $C_{40}H_{60}O_2$, is found in the liquids boiling above 350°C., and has the consistence of honey.

The oil, $C_{15}H_{26}O$, must show the same deportment on heating, for in the products of decomposition of oil of sandal liquids are found boiling at 245 to 260°C., and by the dehydration of these oils hydrocarbons are obtained boiling at 185 to 200°C., of which the analysis corresponds to a hydrocarbon, $C_{10}H_{16}$, containing more hydrogen than cymene.

*Action of acids.*—On heating the oil of sandal, under pressure, at 150°C., with half its weight of glacial acetic acid, for 7 or 8 hours, a liquid is formed which boils between 280 and 300°C. It is a mixture of two products, of which one boils at 280 to 285°C., the other at 298°C.

The first has the formula $C_{30}H_{46}O$, and is the oil, $2C_{15}H_{24}O$, which has lost one molecule of water.

The second product is the acetic ether, $C_{17}H_{28}O_2$, of the oil, $C_{15}H_{26}O$. It possesses a somewhat fruity odor.

Hydrochloric acid produces, likewise, at 125°C., with the oil of sandal, an hydrochloric ether boiling at about 275°C., but the complete reaction is more complex than with acetic acid. The latter reactions the author considers as confirming the composition assigned to the oil of sandal, and demonstrate, moreover, that the oil, $C_{15}H_{26}O$, has the properties of an alcohol.

As to the second oil, $C_{15}H_{24}O$, which by its properties approaches the class of aldehydes, it is considered probable as being the aldehyde of the alcohol, $C_{15}H_{26}O$.—*Rép. de Pharm.*, No. 6, 1882, pp. 252–254.

## A METHOD FOR THE ANALYSIS OF MUSTARD.

By Albert R. Leeds and Edgar Everhart.

So far as is known, there has been only one attempt made to analyze mustard by its separate constituents. Hassall, in his book on Food, its Adulterations and the Method for their Detection, proposes an analysis, partly direct and partly indirect. His method, and the results obtained by it, are those most quoted both in English and foreign books and journals.

His plan of analysis is as follows: The moisture and ash are determined as ordinarily, and the oil by extracting with ether. The myronate of potash is estimated by taking advantage of its well-known reaction with the myrosine contained in the mustard flour, in presence of water. Forty or fifty grains of the mustard are allowed to digest for twenty-four hours, with about 250 cc. of water in a well-corked flask. At the end of that time all the myronate of potash will have been decomposed by the ferment myrosine into glucose, sulphate of potash and mustard oil (allylthiocarbamide), according to the equation $C_{10}H_{18}KNS_2O_{10}=C_6H_{12}O_6+KHSO_4+C_4H_5NS$. The contents of the flask are distilled, and all of the allylthiocarbamide goes over with the water vapor. The end of the condenser dips below the surface of some strong ammonia water to prevent loss of the volatile oil. When no more oily drops come over with the distillate, the receiver and its contents are removed and allowed to stand until the allylthiocarbamide has combined with the ammonia, forming thiosinnamine ($C_4H_5NS.NH_3$). The solution is evaporated to dryness in a tared platinum dish, and from the amount of thiosinnamine found is calculated the myronate of potash.

So far the method is all that can be desired, but the remaining part is open to very serious objections. For the determination of the myrosine and sulphocyanide of sinapine, a combustion of the mustard is made with soda-lime for the total nitrogen, and another portion is fused with alkaline carbonates and nitrates, to estimate the total sulphur. As much nitrogen and sulphur as is contained in the myronate of potash is subtracted from the total nitrogen and sulphur, and from the two residues are calculated the amounts of myrosine and sulphocyanide of sinapine. The cellulose is estimated by difference.

The whole of the sulphur residue, and so much of the nitrogen as is necessary, are calculated into sulphocyanide of sinapine, and the

remaining nitrogen into myrosine. But as myrosine contains about 1·6 per cent. of sulphur, further calculations are necessary. Such calculations may or may not yield correct results, for one has as much right to calculate all the remaining sulphur first into myrosine, or all the nitrogen into either myrosine or sulphocyanide of sinapine, as the sulphur into the last-named compound. The results cannot be calculated algebraically because there is only one equation, and this equation has two unknown factors. In one of the samples of mustard analyzed by Hassall he finds myrosine 31·686 per cent., sulphocyanide of sinapine 5·714 per cent. Taking his percentages of nitrogen and sulphur, and calculating the total nitrogen first into myrosine, one finds myrosine 31·43 per cent., sulphocyanide of sinapine 3·95 per cent.

For the reasons above detailed, the following attempt was made to work out a method for the analysis of mustard, which should be direct throughout, and should rest on an actual separation and estimation of the several constituents. The moisture and ash are determined as usual. The mustard oil is extracted with ether in the following manner: A weighed portion of mustard, after drying at 105°, is carefully brushed into a plaited filter. The filter and its contents are placed in a funnel with straight sides. The stem of the funnel is connected by means of a well-fitting cork, with a small tared flask partially filled with ether, while the funnel itself is connected with an upright condenser. On cautiously boiling the ether, its vapor is constantly condensed, and, falling on the mustard, extracts the oil which is retained in the flask. When all of the oil is removed, the ether is distilled off, and the flask and contents, after drying at 100°, reweighed. The difference between the weight of the flask alone, and that of the flask and oil, gives the amount of oil. After the ether has evaporated from the mustard residue, a tared flask, containing half water and half alcohol, is substituted for that containing ether, and the contents are boiled and condensed as before. The dilute alcohol dissolves both the sulphocyanide of sinapine and the myronate of potash, while it coagulates the myrosine, and leaves both it and the cellulose undissolved. After all the sulphocyanide of sinapine and myronate of potash have been extracted, the contents of the flask are rinsed into a tared platinum dish, evaporated to dryness, dried at 105° and weighed. The dish and contents are then ignited and weighed. The difference of weight before and after ignition gives the total amount of sulphocyanide of

sinapine and myronate of potash. Subtracting the amount of the latter, the difference is the amount of sulphocyanide of sinapine.

After the extraction with alcohol, the filter contains only the myrosine and cellulose, together with a little coloring matter. The alcohol is allowed to evaporate spontaneously, and then the myrosine and cellulose are treated in the cold with a ½ per cent. soda solution. The solution containing the myrosine is decanted through a weighed filter, and the residue is treated again in the same manner. By this treatment all the myrosine is obtained in solution. The cellulose on the filter is dried, weighed, ignited, and the ash weighed. The difference between the two weights gives the cellulose.

The solution containing the myrosine is just neutralized with dilute hydrochloric acid, and about 50 cc. of Ritthausen's cupric sulphate solution added. The solution is then *exactly* neutralized with dilute soda, and the heavy green precipitate of the compound of copper and myrosine allowed to settle to the bottom of the beaker.

The precipitate is collected on a weighed filter and dried at 110°. After drying, the weight of the precipitate is taken. It is then ignited and the ash weighed, the difference giving the total amount of myrosine.

The two following analyses of a sample of brown mustard farina, prepared by H. K. and F. B. Thurber & Co., New York, were made simultaneously. Afterwards a third analysis was made on the same sample.

*Analysis of Brown Mustard Farina.*

| | 1 | 2 | 3 |
|---|---|---|---|
| Moisture, | 6·78 | 6·90 | 6·82 |
| Myronate of potash, | 0·61 | 0·61 | 0.72 |
| Sulphocyanide of sinapine, | 10·97 | 11·19 | 11·21 |
| Myrosine, | 28·45 | 28·70 | 28·30 |
| Mustard oil, | 29·22 | 29·21 | 29·19 |
| Cellulose by difference, | 20·24 | 19·55 | 20·06 |
| Ash, | 3·73 | 3·84 | 3·70 |
| | 100·00 | 100·00 | 100·00 |

A combustion was made of the same mustard, and the nitrogen determined. The sulphur was likewise determined by fusing with alkaline carbonates and nitrates and precipitating with barium chloride.

Nitrogen = 5·337 per cent. Sulphur = 1·489 per cent. Calculating the amounts of nitrogen and sulphur in the myronate of pot-

ash, the sulphocyanide of sinapine and the myrosine, we find nitrogen, 5·342 per cent., and sulphur, 1·50 per cent.

If the amounts of the three last-named constituents of the mustard be deduced from the total amounts of nitrogen and sulphur, according to Hassall, the following will be the percentages:

| | |
|---|---|
| Myronate of potash, | 0·61 per cent. |
| Sulphocyanide of sinapine, | 10·71 " |
| Myrosine, | 28·52 " |

In this case, the results obtained by calculation from the percentages of nitrogen and sulphur are almost identical with those obtained by direct determinations. But the greater ease and certainty of the direct method, and the very considerable errors which are possible when calculations are instituted upon results differing but very slightly from the true ones, must strongly recommend, it appears to us, the direct as compared with the indirect method.

If the mustard is adulterated with starch or flour, the foregoing scheme of analysis may be used as well in the case of pure mustard. After the extraction of the oil with ether, and the sulphocyanide of sinapine and myronate of potash with alcohol, the residue may be treated either with malt extract or with acids under pressure to convert the starch into glucose. The glucose may be estimated as usual.

Fearing that starch was not entirely insoluble in dilute alcohol, and not being able to learn anything on the subject from books, an experiment was made of boiling starch for some time in a mixture of half alcohol and half water. The boiling liquid was filtered hot, and to the filtrate a few drops of iodine solution added. No blue coloration taking place, the starch may be considered insoluble in dilute alcohol, and hence could not interfere in the determination of the sulphocyanide of sinapine and myronate of potash.—*Jour. Am. Chem. Soc.*, 1881, p. 130.

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## PRACTICAL NOTES FROM VARIOUS SOURCES.

BY THE EDITOR.

*For the rapid preparation of Oxygen* Voracek recommends adding hydrogen peroxide to potassium permanganate when the evolution takes place at the common temperature and without requiring special caution. According to "Industrie-Blätter," No. 15, a much cheaper source is barium peroxide, to 15 grams of which are added 100 cc. of a mixture of equal volumes of concentrated potassium bichromate

solution and nitric acid, sp. gr. 1·2. Instead of the bichromate, potassium permanganate may be employed, but is more costly.—*Arch. d. Phar.*, May, 1882, p. 369.

*Karlsbad Sprudel Salt*, which was formerly very improperly prepared (see this journal, 1878, p. 474, and 1880, p. 133, 257), is now obtained by heating the spring water to boiling, filtering, evaporating and saturating the residue with carbonic acid from the springs. The composition of the salt is as follows: Sodium bicarbonate 35·95, lithium bicarbonate ·39, sodium sulphate 42·03, potassium sulphate 3·25, sodium chloride 18·16, sodium fluoride ·09, sodium borate ·07, silicic anhydride ·03, and ferric oxide ·01 part. One liter of sprudel water yields about 5½ grams of salt.

An *artificial* salt resembling the preceding is made, according to Prof. Harnack, by mixing exsiccated sodium sulphate 100 parts, sodium bicarbonate 80 parts, and sodium chloride 40 parts. *Phar. Centralh.*, 1882, No. 21, p. 241.

*Oxidation of Cane Sugar by Chromic Acid.*—Dr. Carl Heyer has studied the effect of chromic acid upon cane sugar and ascertained the products of oxidation to be formic acid, oxalic acid, and carbonic $2CO_2+2CH_2O+2C_2H_2O_4$. The same amount of sugar yielded with anhydride. The formation of oxalic acid had been overlooked by previous investigators, probably because chromic oxalate forms soluble double salts with calcium chloride as well as with ammonia. The result of the action of 8 equiv. $CrO_3$ upon 1 equiv. $C_{12}H_{22}O_{11}$ was: 12 equiv. $CrO_3$: $4CO_2+4CH_2O_2+2C_2H_2O_4$; while with 16 equiv. $CrO_3$ only carbonic anhydride was formed $=12CO_2+11H_2O$.—*Arch. d. Phar.*, May, 1882, p. 336–350.

*Oxidation of Cane Sugar by Potassium Permanganate.*—Maumené reported (1872) having obtained two new acids, hexepinic and trigenic acids among the products of the reaction between the two compounds. Dr. C. Heyer, however, found the supposed hexepinic acid to be merely oxalic acid, and the trigenic acid to be a syrupy liquid containing free acetic and formic acid and potassium salt. The results of oxidation are the same as with chromic acid, carbonic anhydride, oxalic acid, and formic acid. Oxalic acid is produced only in very dilute solutions and at the ordinary temperature; in the presence of free sulphuric acid only carbonic anhydride and formic acid are produced, and with a sufficient amount of permanganate the sugar is completely oxidized to carbonic anhydride and water.—*Ibid.*, June, p. 430–450.

*A Peculiar Reaction of Quinine Hydrochlorate.*—Dr. Vulpius observed that under certain circumstances a solution of this salt is not precipitated by nitrate of silver. If, for instance, 50 grams of a one per cent. solution of this salt be kept in a rotating motion, over 10 grams of silver nitrate solution of the same strength may be added drop by drop before a precipitation of silver chloride is produced. If, however, a single drop of the silver solution be permitted to flow into the test tube without agitation a dense precipitate is at once produced which by subsequent agitation may be finely divided, but does not yield a clear solution. It is possible that at the moment of contact a soluble double salt may be formed.

A solution of morphine hydrochlorate is at once precipitated by silver nitrate.—*Archiv d. Phar.*, May, 1882, p. 361.

*Testing of Benzoic Acid.*—C. Schneider has modified Schacht's method (see this journal, February, p. 56) of testing benzoic acid, sublimed from Siam benzoin, by using 16 (instead of 5) drops of $\frac{1}{2}$ per cent. solution of potassium permanganate, which is completely decolorized and after eight hours the liquid remains colorless ("Phar. Zeitung," No. 20). The artificial benzoic acids, or such sublimed with Siam benzoin, or prepared from benzoin by the wet process, do not effect the complete reduction of the test solution, and in the presence of cinnamic acid the odor of benzaldehyde becomes apparent. The sublimed acid, carefully preserved in dark-colored bottles, does not lose this deoxidizing power on keeping.

Mr. Jahns having noticed the strong reducing power of vanillin upon permanganate, experiments were also made with this compound and with mixtures of vanillin and toluol-benzoic acid. Such mixtures, more particularly those containing $\frac{1}{10}$, $\frac{1}{20}$, or $\frac{1}{30}$ of vanillin behave very similar to sublimed benzoic acid; but, aside from the peculiar odor, the liquid, after eight hours, is of a distinct yellow color, and contains a deposit of colorless or slightly colored crystals.

The author regards the permanganate test as well adapted for distinguishing benzoic acid, sublimed from benzoin, from the acid of other sources, and from that which is contaminated with cinnamic acid. But he advocates its preparation by the pharmacist.—*Archiv d. Phar.*, June, 1882, pp. 401–403.

Professor Ed. Schaer has likewise made a series of comparative experiments with benzoic acid of different origin and permanganate,

following Schacht's directions, and arrived at the following conclusions:

1. Benzoic acid, sublimed from benzoin, exerts a striking reducing action, both in acid and alkaline solution, upon permanganate solution, not shared by benzoic acid of other modes of preparation, or only in a limited degree. The non-officinal benzoic acids give, in alkaline solution, at first a green color.

2. Benzoic acid, prepared from benzoin with lime, behaves like the artificial acid, and resembles the sublimed acid in its reducing action only if prepared from the residues of sublimation or from benzoin containing cinnamic acid.

3. The acid prepared from benzoin with lime does not, by subsequent sublimation, acquire the reducing action of genuine flowers of benzoin.

4. Non-officinal benzoic acids acquire, by sublimation with benzoin, the reducing action upon permanganate; but even with an addition of 20 per cent. of benzoin before the sublimation, the action is by far less pronounced than that of the officinal acid.

5. Cinnamic acid possesses an energetic reducing action in acid and alkaline solution, and in mixtures with non-officinal benzoic acids modifies the behavior of the latter.

6. Benzoic acid, which does not reduce permanganate in acid solution, and causes with it a green color in alkaline solution, does not acquire the property of instantaneously reducing the permanganate, even when mixed with 10 per cent. of cinnamic acid; the reduction takes place only after several minutes.—*Archiv d. Phar.*, June, 1882, pp. 425–430.

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## THE CONVERSION OF MORPHIA INTO CODEIA.

By D. B. Dott, F.R.S.E.

The first chemist to announce the conversion of morphia into codeia was E. Grimaux, whose experiments are described in "Comptes Rendus" (see "Am. Jour. Phar.," 1881, p. 466). Reference must also be made to the communication of O. Hesse to the "Pharmaceutical Journal" ([3], xii, 157), on the "Methyl Ether of Morphia." The former of these chemists, by acting on morphia dissolved in alcoholic solution of soda with iodide of methyl, in molecular proportions, obtained a crystalline alkaloid which resembled codeia in all its properties, with the apparent exception of possessing a slightly different

rotatory power. M. Grimaux considers that this divergence must not be taken as proving any difference in the alkaloids, but, judging from their exact agreement in other respects, is probably only an error of experiment. Hesse attempted to prepare codeia by acting with methyl iodide on a methylic alcohol solution of morphia potassium. By this means he obtained β-methyl-morphia, isomeric with codeia. According to Hesse's description, this alkaloid is amorphous, and its hydrochloride differs in some important respects from that of codeine. For instance, it loses all its water of crystallization at 100°C., while hydrochloride of codeia loses only half a molecule under the same circumstances. The solubility of the artificial salt at 18°C., in water, is 1 in 10·8, while that of codeia muriate is 1 in 23·8. A saturated solution of the former gives, with potash, an oily, permanently amorphous precipitate, but the codeine salt gives at once a crystalline precipitate. The specific rotatory power of both was found to be the same. Hesse holds that the idea of the identity of these two salts cannot be maintained on account of the differences above referred to, especially the fact of the β-methyl-morphia being only obtained in the amorphous state. As, however, M. Grimaux did not employ morphia-potassium, but morphia-sodium, Hesse repeated his experiment, using the latter instead of the potassium compound, but in other respects conducting the experiment as before. By this means he obtained a mixture of β-methyl-morphia and a base having a "great similarity to codeia," differing indeed therefrom only in its optical behavior.

In my first experiment I conducted the operation of converting the morphia into codeia, according to the process described by Grimaux, using molecular proportions of morphia, soda, and methyl iodide. The alcohol was distilled off and the residue exhausted with ether. The ether, on evaporation, deposited well-defined crystals, resembling the ordinary hydrate of codeia. These crystals were converted into hydrochloride, which was purified by recrystallization from water. An aqueous solution was prepared by digestion at the ordinary temperature, and the solubility of the salt determined by evaporating a weighed portion of the solution to dryness, the weight of the residue *plus* 2·42 per cent. being taken as the weight of crystallized salt dissolved. At 12°C. the solubility indicated was 1 in 27·0. As regards its rotatory power, the result obtained was $(\alpha)_o = -109{\cdot}9$. Codeia hydrochloride prepared from opium gave a solubility of 1 in 28 2 at 12°C., and a specific rotatory power (determined as above) of — 111·6.

I next prepared β-methyl-morphia in the manner described by Hesse, using equal molecules of the substances and potassic in place of sodic hydroxide, as employed by Grimaux. After digestion of the alcoholic solution on the water-bath for an hour, hydrochloric acid was added to neutralization, and the spirit evaporated. The residue was treated with potash in excess and exhausted with ether. When left to spontaneous evaporation, the ether yielded large crystals having all the appearance of codeia. These crystals were converted into muriate, which was crystallized two or three times. The salt thus obtained resembled the ordinary codeia hydrochloride. By allowing a hot aqueous solution to cool, the solubility obtained for 15°C. was 1 in 23·4. I refrain from entering much into detail, as I intend to have the subject thoroughly investigated, especially as regards the optical properties of the substances.

Reviewing the results obtained by Grimaux, Hesse, and myself, I regard it as almost certain that codeia "α-methyl-morphia" and "β-methyl-morphia" are one and the same. It is difficult to account for the behavior of Hesse's β-methyl-morphia hydrochloride, as it is quite at variance with my experiments, both as regards solubility and loss of water at 100°C. I have a strong impression that the salt he worked with was impure. Be that as it may, it is certain that the only difference which has been observed between codeia and α-methyl-morphia is the slight variation in their rotatory power. I agree with M. Grimaux in not attributing great importance to this. It is probably due to the persistent presence of some impurity, which is dextro-rotatory or optically indifferent. In common with Hesse, I would discountenance the proposal of Grimaux to name the ethers of morphia "codeines." There does not appear to be any advantage in such a name, which could only lead to confusion. When the constitution of these bases is fully understood a satisfactory systematic nomenclature may then be introduced.—*Phar. Jour. and Trans.*, June 10, 1882.

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## THE METHYL ETHERS OF MORPHINE.

By O. Hesse.

In a former communication I drew a distinction between α-methyl-morphine, which body I obtained through the action of methyl iodide upon morphine-sodium, and β-methyl-morphine, which alone could be obtained by the action of methyl iodide upon morphine-potassium. In

consequence of the recent remarks of Dott upon the same subject, I wish as a supplement to that communication to mention some facts that I have observed since my former publication on the ether in question.

With respect first to the *α*-ether, it is known that it differs from codeine only slightly in its optical behavior. It turns out, however, that this difference is not an essential one, since the hydrochlorate, after several recrystallizations from water, agrees perfectly with codeine hydrochlorate in its optical character also. There is, therefore, no doubt that the synthetically prepared codeine is identical with that occurring in opium.

Experiments which were made by me to clear up the question showed further that codeine, or the *α*-methyl-ether of morphine, is also formed when morphine-potassium is used (instead of morphine sodium), but that the yield of codeine sometimes amounts to not more than traces. This unfavorable result is for the most part due to the fact that methyl iodide which has not yet taken part in the reaction, combines with the codeine formed to produce iodomethyl-codeine. In this process there is also a formation of iodomethyl-morphine, and when calculated quantities of morphine, methyl iodide, and potassium hydrate (or sodium hydrate) are used, it is clear that at the conclusion of the reaction free alkali must be present in the solution.

This alkali leaves the codeine that may have been formed, as well as the iodomethyl-morphine, unaltered upon warming, but the iodomethyl codeine very readily decomposes it in accordance with the equation:

$$C_{17}H_{18}(CH_3)NO_3,CH_3I+KOH=C_{17}H_{17}(CH_3)_2NO_3+KI+H_2O.$$

Consequently dimethylmorphine is formed, and it was this body that I obtained before and described under the name of "*β*-methyl-morphine." The formation of this body takes place more readily when, as was done by me previously, alkali is added before extraction with ether.

The *β*-methyl-ether is naturally most conveniently prepared by the direct action of potash or soda ley, ammonia or baryta water upon iodomethyl-codeine. Its formation takes place gradually even at the ordinary temperature, but rapidly upon heat being applied.

I had on a former occasion found the amount of chlorine in the hydrochlorate somewhat too high, which would on the other hand account for a deficiency in the amount of carbon. The ground of this former discrepancy I cannot state, since I cannot detect any contami-

nation with another substance in the salt in question. However, in my recent operations I have obtained results corresponding strictly with the formula $C_{17}H_{17}(CH_3)_2NO_3,HCl+2H_2O$.

The hydrochlorate of the $\beta$-methyl-morphine (dimethylmorphine) dissolves in pure concentrated sulphuric acid with a coffee-brown color, which, however, soon passes into dark violet. In this it distinctly differs from the hydrochlorate of the codeine prepared from opium, which gives a colorless solution with concentrated sulphuric acid.

On the other hand, I may remark with respect to the hydrochlorate of the synthetically prepared codeine that it not unfrequently dissolves in concentrated sulphuric acid with a faint brownish or violet color. This reaction is nevertheless not characteristic of this substance, but is due to an admixture of dimethylated morphine.

The two methyl ethers are consequently two well characterized substances, the relations of which to morphine will be clearly seen from the following:

| | |
|---|---|
| Morphine, . . . . . | $C_{17}H_{17}NO\begin{cases}OH\\OH\end{cases}$ |
| Monomethyl Morphine,<br>$\alpha$-Methyl-Morphine,<br>Codeine, . . . . . | $C_{17}H_{17}NO\begin{cases}OH\\OCH_3\end{cases}$ |
| Dimethyl-morphine,<br>$\beta$-Methyl-morphine, . . . | $C_{17}H_{17}NO\begin{cases}OCH_3\\OCH_3\end{cases}$ |

—*Phar. Jour. and Trans.*, June 17, 1882.

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## QUININE IODATE AND BROMATE, AND THE PHYSIOLOGICAL ACTIVITY OF SUPEROXIDIZED MOLECULES.

By Charles A. Cameron, M.D.

Read before the Medical Society of the King and Queen's College of Physicians, Wednesday, May 3, 1882.

The researches of Arthur Gamgee, Priestley and Larmuth have shown that the three forms of phosphoric acid and of vanadic acid have very different degrees of physiological activity. The salts of orthophosphoric acid are almost inert when their bases are inactive, whilst the pyrophosphates and metaphosphates are poisonous. The orthovanadic acid is poisonous, but pyrovanadic acid and metavanadic acid are still more poisonous.

The high physiological activity of the pyro- and metaphosphates has been attributed to the unsaturated condition of their nuclei. These salts are not statical, for they can take up additional basic material. For example, calcium metaphosphate can combine with two molecules

of lime to produce a molecule of calcium orthophosphate—$Ca(PO_3)_2 + 2CaO = Ca_3(PO_4)_2$.

Carbon dioxide and carbon monoxide are poisonous, but the latter is by far the more poisonous. According to the modern doctrine of atomicity, carbon atoms have four "bonds," that is, a carbon atom has an atom-fixing power equal to that of four atoms of hydrogen or other monad elements. In carbon dioxide the four bonds of the carbon atom are fully satisfied by the four bonds of the two oxygen atoms, O=C=O.

In carbon monoxide only two of the carbon atom bonds are in combination with oxygen, and the remaining bonds combine with each other, C=O. Such a molecule is said to be unsaturated.

*High Molecular Weights a Cause of Physiological Activity.*—High atomic weight and complex molecular structure are stated to be causes of high physiological activity. The poisonous elements have as a rule higher atomic weights than elements belonging to the same groups which are comparatively physiologically inert. There are, however, exceptions to these rules. Lithium, with an atomic weight of 7, is more active than sodium, with an atomic weight of 23. Arsenic, with a lower atomic weight than antimony, is more poisonous than the latter. Chlorine in the free state is more active than iodine, though on the whole the iodine compounds used in medicine have somewhat smaller doses than the corresponding chlorine compounds.

Rabuteau found that with one exception (that of methyl alcohol) the toxic power of the alcohols increased with their molecular weight. Amyl alsohol, which has a molecule composed of 18 atoms, is eight times more poisonous than ethyl alcohol, the molecule of which contains 9 atoms. On the other hand, oxalic acid has a molecular weight of 90, and is poisonous, whilst malic acid, with a molecular weight of 134, is a constituent of wholesome fruits. Albumin has a very high molecular weight.

*Superoxidized Bodies.*—Physiological activity seems to be more influenced by an unsaturated condition of molecules than by their molecular weight or degree of complexity. It is also, I am disposed to believe, influenced by a condition of molecules which I venture to describe as *superoxidized*. In potassium iodide we have, according to the doctrine of quantivalency, a saturated molecule. The salt is composed of two monad elements, and the unit of equivalence of each of its two atoms is fully satisfied. According to the graphic or pictorial

method of representation the molecule is constituted as follows, K—I.

Although potassium iodide is a saturated and a stable body, three or four atoms of oxygen may be combined with it so as to form potassium iodate ($KIO_3$) or potassium periodate ($KIO_4$). In the latter salt only two of the atoms of oxygen are in union with the potassium and iodine, six oxygen bonds satisfying each other, K—O—O—O—O—I. In this compound there are three atoms of oxygen in excess of the number requisite to saturate the iodine and potassium; hence we may term potassium periodate a superoxidized compound.

Periodic anhydride is a more striking example of a superoxidized body. It is composed of two atoms of iodine combined with seven of oxygen, I—O—O—O—O—O—O—O—I. In this compound only two of the fourteen oxygen bonds are in combination with the iodine.

It may of course be said that iodine is a septivalent element, but in atom-fixing power it acts in general like other monads.

If we hold that iodine and bromine are monads, then the higher terms of their oxygen series may be regarded as in reality unsaturated molecules. They contain oxygen atoms combined only with other oxygen atoms. Such compounds are unstable. They are all decomposed by simple heat at comparatively low temperatures.

When superoxygenated compounds are introduced into the system, it might be expected that their oxygen being loosely combined would unite readily with elements of the blood. It is, however, stated that potassium chlorate passes through the body unchanged. It is open to doubt whether or not the whole of the chlorate taken appears subsequently in the urine. It has been alleged that quinine passes unchanged through the body, but it is now known that only two-thirds of the quinine taken into the stomach can be detected subsequently in the urine. Even if all the potassium chlorate taken were found afterwards in the urine, that would not be positive proof that the potassium chlorate had not been partially deoxidized and reoxidized in its passage through the system. Besides drugs produce powerful catalytic effects without undergoing themselves any chemical changes.

Potassium iodate appears to act more powerfully upon the system than potassium iodide. I know a person, accustomed to take ten grain doses of potassium iodide without experiencing any unpleasant symptoms, who cannot take even five grains of the iodate without being attacked by coryza.

I am disposed to believe that the chlorates, bromates, and iodates are more active physiological agents than the corresponding chlorides, bromides, and iodides; they are all composed of superoxidized molecules. It is certain that chlorate of sodium is more powerful than chloride of sodium, or common salt. We may from analogy infer that iodate of potassium is a more active physiological agent than the iodide of potassium.

*Ferric Iodate.*—Some years ago I suggested the use of ferric iodate ($Fe_2(IO_3)_6$) as a substitute for the unstable ferrous iodide ("Dublin Quarterly Journal of Medical Science," May, 1869, vol. xlvii, p. 354) It was largely prescribed in Dublin, and although a nearly insoluble salt, it was found in large doses to produce iodism. It was favorably noticed by Dr. Anstie in "The Practitioner" for June, 1869, p. 366.

*Quinine Iodate.*—Last year I gave a formula for the preparation of iodate of quinine in combination with an effervescing preparation, to Messrs. J. J. Graham & Co., of Westmoreland street, Dublin, and since last May, they have, as they inform me, disposed of nearly 1 cwt. of the compound. It has been prescribed largely by Mr Porter, surgeon to her Majesty, Dr. Samuel Gordon, Professor Moore, Dr. Smyly, Professor Macnamara, and many other leading practitioners. These gentlemen inform me that they have found it a very useful remedy in the treatment of neuralgia, severe articular pains which had resisted the employment of the usual remedies, sluggish forms of pulmonary congestion, secondary syphilitic disease, and malarial enlargement of the spleen.

Iodate of quinine is a salt which appears to have been scarcely studied; only two references to its existence are to be found in the books and journals relating to chemistry and pharmacy. Sérullas states ("Annales de Chimie et de Physique, t. xlv, 282,) that it may be prepared by dissolving quinine in a hot solution of iodic acid, and that on cooling the solution the salt crystallizes out in a form resembling sulphate of quinine. Sérullas does not appear to have analyzed the salt. According to Pelletier and Caventou ("Annales de Chimie et de Physique"), both iodate and hydriodate of quinine are formed by digesting quinine and iodine by the aid of heat.

Quinine iodate may be prepared by digesting freshly precipitated and still moist quinine with a warm solution of iodic acid, in the proportion of a molecule of each (the iodic acid should be dissolved in 8 or 10 parts of water). The resulting mass cannot be dried at the water-

bath heat as it causes some decomposition of the salt. Dried at a temperature of 60°F., and then placed *in vacuo* over sulphuric acid, it undergoes no further loss of weight. The salt has a white, pearly appearance, and consists of extremely minute needle-shaped crystals, which contain no water; boiling water does not decompose it; it is very slightly affected by strong sulphuric acid; hydrochloric acid and dilute sulphuric acid dissolve it readily; it is not quite so soluble in acetic acid. Spirit of wine effects its solution readily, but in ether and chloroform it is sparingly soluble. Seven hundred parts of cold water dissolve one part of the iodate; in warm water it dissolves much more readily.

The mean of several determinations of the amount of iodine in the dried iodate of quinine gave 21·8 per cent.; the salt has therefore the following formula: $C_{20}H_{24}O_2N_2,HIO_3$. The theoretical amount of iodine for such a formula is 22·92, but the small deficiency in the salt was due to the presence of a little free quinine; the iodate was found to be faintly alkaline from this cause.

The granulated effervescing iodate of quinine is composed of a mixture of the pharmacopœia compound of sodium bicarbonate and citric and tartaric acids with the iodate. Each drachm of the compound contains 2 grains, or one dose of the iodate.

I have not made many examinations of the urine of persons under administration of quinine iodate. In the case of a patient of Dr. Elliott who was using the iodate for about a fortnight, the urine contained so much free hydriodic acid or iodides, that it gave a yellow precipitate with nitrate of lead. In another case, iodic acid and hydriodic acid were detected in the urine within half an hour after the iodate had been taken, but no trace of quinine could be found in it. In the urine of the same person, passed three hours later, quinine was found.

*Bromate of Quinine* ($C_{20}H_{24}N_2O_2,HBrO_3$).—I can find no account of this salt in the chemical books or journals; so far as I am aware, it has not been described up to the present. It may be prepared by precipitating barium bromate by sulphate of quinine, or by neutralizing quinine with bromic acid. It occurs when air-dried in small asbestos-like masses, which, under the microscope, are seen to consist of very long needles.

Quinine bromate has the same constitution as the iodate of quinine, but it is more soluble in water, namely, 1 part in 250. Warm water dissolves it freely. The dry salt may be heated on the water-bath

without discoloration, but its solution, when evaporated to dryness, leaves a residue more or less decomposed. The salt dissolves readily in hydrochloric and dilute sulphuric acids, and in spirit of wine. Acetic acid acts less readily upon it; touched with a drop of strong sulphuric acid it detonates, emits a puff of dark smoke, and almost wholly disappears. On iodate of quinine, sulphuric acid produces only a slight yellow coloration, which vanishes on the addition of water, the salt dissolving and forming a colorless solution.

The original paper is supplemented by the medical opinions of a number of physicians who state that they have found the quinine iodate and bromate valuable remedial agents.—*Phar. Jour. and Trans.*, July 1, 1882; from *Dublin Jour. of Med. Sci.*, June 1882.

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## THE PRODUCTION OF OXYCHLORIDE OF CARBON IN CHLOROFORM.

By J. Regnauld.

The compound incontestably the most dangerous by which chloroform can be contaminated is the oxychloride of carbon (chloroxycarbonic gas, phosgene, etc.) resulting from its decomposition when exposed to air and radiant light.

Previous to studying the physiological, or rather toxic properties of oxychloride of carbon, Messrs. Regnauld and Roux thought it would be interesting to determine the exact conditions of its formation in chloroform, on which point there exists a difference of opinion, since the alteration of chloroform can only be prevented when its true cause has been ascertained. They now publish the results of some preliminary experiments in which the slow action of light has been substituted by the more rapid influence of electricity and ozone.

(1) The spark from a Ruhmkorff coil discharged in a mixture of chloroform vapor and atmospheric air immediately gives rise to a large proportion of oxychloride of carbon.

(2) When air saturated with chloroform vapor is caused to circulate slowly in an effluve apparatus the chloroform is decomposed and yields a gaseous product consisting nearly entirely of phosgene, recognizable by its intolerably suffocating odor, and its conversion in contact with barium hydrate into barium chloride and carbonate.

(3) A bulb of thin glass, full of chloroform, and sealed at the lamp, was placed in a recipient which was first exhausted and then filled

with air ozonized by the electric discharge. The bulb being broken, the vapor of the chloroform, in contact with the ozonized air, was changed into oxychloride of carbon.

(4) In presence of atmospheric oxygen, therefore, chloroform is decomposed by the passage of the spark or the current. Further, the production of phosgene is independent of the thermic and electric phenomena of the first two experiments, since it takes place upon simple contact of the vapor of chloroform with ozonized air.

(5) If a current of nitrogen entirely free from oxygen and mixed with vapor of chloroform be passed through an effluve apparatus, the chloroform is decomposed; but in the absence of oxygen no oxychloride of carbon is formed. The formation of hydrochloric acid is evident, as well as of aromatic products remarkable for their intense and persistent odor which recall in a high degree those of several essential oils. The authors have since identified these odorous compounds with the trichloride of carbon ($C_3Cl_6$) or the sesquichloride ($C_4Cl_6$).—*Phar. Jour. and Trans.*, June 17, 1882; *Journal de Pharmacie et de Chimie* [5], v. 504.

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## SOME REMARKS UPON MODERN PHARMACEUTICAL STUDY.

By H. J. Möller.

(Continued from page 323.)

### Switzerland.

While, in the middle ages and the few following centuries, the science of pharmacy in Switzerland was developed nearly up to the German requirements, in later years, French influence, starting from Geneva, has modified Swiss pharmacy, and has extended itself more and more towards the northeast. For example, when in the summer of 1880, I crossed Switzerland on my journey from Vienna to Strassburg, I had full opportunity to observe that the pharmacies in Geneva were fitted up quite like those in Paris, while the pharmacies in Basel and Berne had quite the same aspect as in South Germany.

The new rules for pharmaceutical study in Switzerland tend to combine these two different systems.

The Swiss pharmacy cannot only boast of possessing the greatest pharmacologist[1] of the present day amongst its sons, but Switzerland still possesses pharmaceutists with such enthusiasm for their science as Professor E. Schär in Zürich, and it is, therefore, quite natural that the Swiss pharmacy is still developing itself, and that the new plan for pharmaceutical study will raise this country to a high position in our science.

[1] Professor F. A. Flückiger was from 1853 to 1860, a pharmaceutical chemist in Burgdorff, at Berne, and later a professor at the university at the last mentioned city. He first went to Strassburg in the year 1873.

I am highly indebted to Professor E. Schär, who has kindly given me all the information for which I asked, and has also sent me a copy of the new plan, for the study of which plan I here shall translate that part which I think will be the most interesting to the readers of this Journal.

The title of the law is the following: "Verordnung für die eidgenössischen Medicinalprüfungen (Vom 2 Heumonat), 1880." [1]

Art. 1. The pharmaceutical examinations are held in Basel, Berne, Geneva, Lausanne and Zürich.

Art. 52. The pharmacists must pass two examinations (corresponding to the English "Minor" and "Major.")

Art. 53. *The "Minor"* ("die pharmaceutische Gehülfenprüfung") can only be passed by the candidate who in advance has deposited: (1) the certificate of a "Preliminary examination" (exactly corresponding to the above-mentioned German "Preliminary examination"); (2) the certificate of an apprenticeship of three years (two years are sufficient if he has passed *all* the classes in the "Gymnasium" (again the same as in Germany and Russia).

Art. 54. *The practical part* of the "Minor" embraces: (1) a written and an oral translation of two articles from the Pharmacopœa Helvetica; (2) the preparation of at least three remedies according to prescriptions; (3) the making of a chemical and a "galenical" preparation after the Pharmacopœa Helvetica; (4) two not very difficult analyses of officinal drugs or preparations.

Art. 55. *The oral examination* for the "Minor" consists of: (1) Systematic botany and special knowledge of the medical and economical plants; (2) elementary physics; (3) pharmaceutical chemistry; (4) materia medica; (5) dispensing of medicines, posology, and the rules for pharmaceutical preparations.

Art. 57. *The "Major"* ("die pharmaceutische Fachprüfung.") Before the student can be admitted to this examination he must have passed the "Minor," have been an assistant for a year, and have studied at the universities for *at least* four semesters (*i. e.*, two years). In these two years he is occupied with his studies only, and must, in this time, also work in the chemical laboratory of the university.

Art. 58. The "Major" is divided into a practical (including a written), and an oral examination.

*The practical* consists of: (1) Two chemico-pharmaceutical preparations and a written report upon these; (2) a qualitative analysis of an adulterated substance (medicine or food), or of one impregnated with poison, and a written report upon it; (3) a qualitative analysis of a mixture which ordinarily does not contain more than six substances (with written report), (4) a quantitative analysis of one substance in a mixture (volumetric and gravimetric analysis, with written report); (5) a microscopical research of some substances; (6) a written elaboration of a subject, taken from pharmacy, materia medica, or applied chemistry.

Art. 59. *The oral part* of the "Major" embraces: (1) Botany; (2) physics; (3) mineralogy; (4) theoretical chemistry; (5) pharmaceutical chem-

[1] *I. e.*, July.

istry; analytical chemistry (including forensic analysis, hygiene and sanitary police); (7) materia medica; (8) pharmacy.

Art. 73. This law will be in force January 1, 1881.

This plan for pharmaceutical study must be regarded as one of the best at the present day, and is indeed an honor to Swiss pharmacy.

Formerly, the number of pharmacies was a limited one, but according to the *Bundesgesetz*, vom 19. Christmonat,[1] 1877, every pharmacist who has passed his "Major" is now allowed to establish himself when and where he will.

SPAIN.

I shall here translate that part only of the Danish edition of my remarks on this country which especially concerns the modern Spanish pharmaceutical study. All my information obtained upon this country I have obtained from Don Pablo Prolongo, the most important pharmacist in Málaga, through the kind offices of Mr. H. W. Scholtz, the Danish Consul in that city.

Spanish pharmacy, which in a part of the middle ages—through the influence of Arabian culture—held the highest position in the world, had, about the end of the last century, fallen greatly into decay. Then Don Carlos declared (in the year 1800) pharmacy independent of medicine, and new rules were formed for the "visitation" of the pharmacies and for the pharmaceutical examinations. In 1804 a special pharmaceutical committee was elected to complete these reforms, and the result of the activity of this "junta superior" was the establishment of four pharmaceutical academies,[2] first in Madrid (1815), later in Sevilla, Barcelona (now in Granada), and Santiago de Compostela.

In order to be admitted to these four academies it was only demanded that the young man should be a "bachiller en filosofía escolástica" (corresponding to the German "student" and the French "bachelier"). The first year he learned botany, zoology and mineralogy, which lectures lasted for nine months. In the second year he learned physics (three months) and chemistry (six months). In the third year, materia medica; and in the fourth year, experimental pharmacy (theory and practice). When he could prove that he had followed all these lectures, he might pass the examination to be a "bachiller en farmacia." *Afterwards* he must spend two years in practical work in a laboratory, managed by a pharmaceutical teacher,[3] and if he could at length prove that he had passed all his six years of study, he might present himself for examination as pharmacist and then be a "licenciado en farmacia." If he made further studies he could become a doctor in pharmacy.

Some months ago the Spanish Government published a new law, which arranges pharmaceutical study in a very interesting way. This law has the title "Real decreto de trece de Agosto de mil ochocientos ochonto" (Royal decree of the thirteenth of August, 1880) and embraces all the studies

[1] *I. e.*, December.

[2] A. Phillippe und H. Ludwig: "Geschichte der Apotheker," Jena, 1858, p. 1073.

[3] The letter of Don Pablo Prolongo reads thus: "*Posteriormente* debia paror dos años de práctica en una oficina de un profesor de la misma facultad" (*i. e.*, the Faculty of Pharmacy).

in the universities;[1] here I shall communicate that part of the law only which especially regards pharmacy.

*The Royal Decree of the thirteenth of August*, 1880.

*Secondary instruction* ("Segunda enseñanza").

Article 11.—The normal distribution of the studies is the following:

*First class*, Latin and Spanish (first course), geography. *Second class*, Latin and Spanish (second course), history of Spain. *Third class*, rhetoric and poetry, arithmetic and algebra, universal history. French (first course). *Fourth class*, psychology, logic and moral philosophy, geometry and trigonometry. French (second course). *Fifth class*, physics and chemistry, natural history and the elements of physiology and hygiene, elementary agriculture ("Agricultura elemental").

Article 36.—Relates to the Faculty of Mathematics and natural sciences.

Article 48.—Concerns the Faculty of Medicine.

Article 49.—The Faculty of Pharmacy ("Facultad de farmacia").

The studies with this faculty can be made at the universities in Madrid, Barcelona, Granada and Santiago.

Articles 50 and 54.—The lectures of this faculty are arranged in the following way:

A. *The period of licentiate* ("Período de la licenciatura"). *First class*, physics, zoology, botany, mineralogy and theoretical chemistry (these lectures are held by the Faculty of Mathematics and Natural Sciences). *Second class*, animal, botanical and mineralogical materia medica. *Third class*, inorganic pharmaceutical chemistry. *Fourth class*, organic pharmaceutical chemistry. *Fifth class*, practical exercises in the determination of drugs. Practical pharmaceutical operations.

B. *The period of doctorate* ("Período del doctorando"). Chemico-medical analyses. The history of the medico-pharmaceutical sciences.

By this, one will see that the new plan resembles much the old arrangement, except that the two practical years are now confined to one year (*i. e.*, the fifth class). Before the young man commences his five years of study at the university he must be a "bachiller," *i. e.*, have passed all the secondary instruction which is mentioned in Article 11 of the law. Then he follows the lectures at the university during four years as an "alumno de farmacia," and in the fifth year he is practically educated. Now he passes his "Major," and is then a "licenciado de farmacia," and can establish himself as a pharmacist ("farmacéutico," or "boticario") where he will; he must only announce this to the government, and submit to the annual "visitations" of the pharmacies. If he wishes to make some further studies, he can become a doctor in pharmacy. It is very interesting to see how much this arrangement resembles the corresponding examinations in Italy and Greece.

## Portugal.

The history of pharmacy in this country resembles very much that of Spain, but the Portuguese pharmacy seems always to have been a little less developed than this science in a neighboring country. My information on pharmaceutical education in Portugal I have obtained from reliable sources,

[1] This decree is published in "La farmacia española," Num. 35 (26 de Agosto), 1880.

through the Danish Consul-General in Lisbon, Mr. F. T. O'Neill. The plan of education is rather old (1854) and differs from the Spanish, but as a reform has lately been made in a neighboring country it is to be believed that an improvement will also soon appear in Portugal. I shall, therefore, give only some short remarks here, more for reason of completeness than because they are very interesting or instructive.

The most important laws, regarding pharmacy, are the decrees of December 29, 1836 (concerning the establishment of pharmaceutical schools); December 21, 1844 (concerning matriculation of pharmaceutical students); August 12, 1854 (concerning the demands at examinations); and April 19, 1866 (concerning the requirements at the examinations of pharmacists of the second class).

To become a pharmacist, it is not always demanded (as in Spain) that the apprentice shall have passed the examination which gives him the right to follow all the lectures at the university. The appentices ("os praticantes," or "os discipulos de pharmacia") must only, before they present themselves for the "Major," have passed a certain number of the classes in the classical school ("os lycêos") and have finished their practical education.

There are two classes of pharmacists.

*Of the pharmacists of the second class* ("os pharmaceuticos de segunda classe") is demanded a practical education of eight (!) years in one of the pharmacies of the kingdom ( . . . . . "oito[1] annos de pratica em qualquer pharmacia do reino" . . . . ) in addition to a study of three years in three classical schools. The studies for the last examination are made at the polytechnical schools. It is expressly said that the pharmacists of the second class do not follow the lectures at the medico-pharmaceutical schools, which institutes are to be found in Coimbra, Lisbon and Oporto.

*The pharmacists of the first class* ("os pharmaceuticos de prima classe") must, on the contrary, have passed the whole classical school. They also pass a course of two years at the polytechnical and medico-pharmaceutical schools. In the polytechnical schools they learn inorganic and organic chemistry, chemical analysis and botany; in the medico-pharmaceutical schools, materia medica and practical and theoretical pharmacy.

After having passed the examination, the pharmacist can establish himself when and where he will. The pharmacists of the sedond class are much more numerous than those of the first class.

(To be continued.)

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## VARIETIES.

COMP. IODOFORM OINTMENT is made by Dr. Q. C. Smith by mixing iodoform, ergotin, pine tar and balsam Peru, of each ʒi, with vaseline ℥i. —*South. Pract.* April, 1882,

[1] This number is found several times in the Portuguese communications, and can thus be no mistake.—H. J. M.

STYPTIC COLLOID.—The following will instantly coagulate blood, forming a consistent clot, under which wounds will readily heal:

| | |
|---|---|
| Collodion. . . . . | 100 parts. |
| Carbolic acid, . . . . | 10 " |
| Tannic acid, . . . . | 5 " |
| Benzoic acid, . . . . | 5 " |

Mix the ingredients in the above order.—*Chemist and Druggist.*

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USE OF PYROGALLIC ACID.—M. Vidal, after using pyrogallic acid with care in the treatment of psoriasis, has tried a salve with good effect to heal phagedenic ulcers and to cicatrize chancres. He applied it to the ulcer daily for three days, and states that the pain caused is only moderate, and lasts but from eight to ten minutes. The formula he recommends is acid pyrogallic 20 grams and lard or vaseline 100 grams.—*Bull. Soc. de Thérap.*

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CAMPHORATED CHLORO-TANNATE OF IODINE is the name given by Dr. Q. C. Smith, of Austin, Texas, to the following preparation which is used as a topical application to bleeding ulcers and cancers of the cervix uteri:

| | | |
|---|---|---|
| ℞ | Chloral hydrate, . . . . | ℥i |
| | Iodine, . . . . | ℥ss |
| | Oil of camphor, . . . . | ℥vi |

Dissolve and add sufficient tannic acid to bring the mixture to the consistence of *thick* syrup.—*Southern Practitioner*, April, 1882.

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IODOFORM INSANITY.—According to Max Schede ("Centralblatt für Chirurgie," No. 3, 1882), the use of iodoform externally, particularly in children, has been attended by marked psychical symptoms even at times amounting to true insanity. General mental confusion has in at least two instances been traced to it, recovering when local applications of iodoform to wounds have been removed, and reappearing on their reapplication. He has had also one case of deep melancholia result from its use; two cases of raptus melancholicus and the three cases of simple depression. It is probable that iodoform only has these effects in patients of a neuropathic diathesis.—*Chicago Med. Review*, March 15.

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CARBOLIC ACID POISONING.—Dr. Inglessi ("Bulletin Générale de Thérapeutique") has arrived at the following conclusions respecting this: First. The symptoms by the external application of carbolic acid are the same as those which arise from the absorption of the poison by the stomach from

the gastric mucous membrane. Second. Poisoning occurs certainly where the acid has been applied to the skin or injected into a serous or mucous or abscess cavity. From the exposed surface of a wound the absorption is very slight, and the toxic effects trifling. The mucous membrane of the respiratory passages may serve as the place of introduction of the poison. Third. The effects may assume a very acute form, a less acute form, or a chronic form. Fourth. There exist certain idiosyncrasies; women and children are especially liable to carbolic acid poisoning. Fifth. The toxic dose is variable. In persons predisposed, one grain of carbolic acid may be sufficient to poison. Sixth. Carbolic acid as an application to contused wounds should be used with caution, and in some cases should even be substituted by a less dangerous agent. Seventh. The treatment of severe carbolic acid poisoning should consist in artificial respiration, diffusible stimulants, especially the hypodermic injection of ether. In other cases the removal of the cause, through the discontinuance of the remedy, will suffice to remove the symptoms.—*Chic. Med. Review*, June 1.

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An Anti-Nauseant.—℞ Creasote, 20 drops; acet. acid, 40 drops; morph. sulph., 2 grains; water, 2 ounces, M. Sig. Teaspoonful in a little water.—*Ohio Med. Jour.*, April, 1882.

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The Benzoates in Dysentery.—Surgeon Harris ("Ind. Med. Gaz.") states that fifteen grains of benzoate of ammonium or sodium, three or four times a day, are of the utmost value in treatment of acute and sub-acute disentery. This drug, more especially the ammonium salt, causes an active secretion of bile from the liver with cessation of the acute symptoms. In the majority of cases the patients readily tolerate the drug; under its use the stools rapidly become fecal, possibly owing to the excessive secretion of bile, which is thus poured into the intestine, and acts beneficially on the congested and perhaps ulcerated large intestine.—*Practitioner*, Feb.

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Homatropin in the Treatment of Phthisis.—Dr. Froumüller reports ("Memorabilien") sixteen cases of phthisis with night-sweats in which homatropin was successfully used. The usual dose was ·15 (gr.iiss) in pill form, or ·015 (gr.¼) by injection. It was found that one injection would, as a rule, stop the night-sweats for several days. The fever and cough were also lessened, and the drug seemed to have the effect of bringing the disease to a stand-still for a time. The advantage over atropin is that it (homatropin) produces its effects without any toxic symptoms, such as

widening of the pupil, dryness of the throat. etc. The maximum dose is gr.$\frac{1}{2}$ to gr.i by injection.—*Med. Record; Amer. Med. Digest*, May.

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AGARICUS IN THE TREATMENT OF NIGHT-SWEATING.—Dr. Wolfenden finds that atropia yields excellent results when given in doses of $\frac{1}{70}$ of a grain. It is, however, a dangerous drug to use, on account of its poisonous properties. Dr. Wolfenden therefore prefers to employ agaricus, which is of equal value to atropia, while it is quite harmless, since ten grains too much or too little produce no toxic effects. Agaricus is a light, bulky, brown powder, of very bitter taste, and is best administered in the form of a confection, with a little jam. Twenty grains are usually quite sufficient given at bedtime, though thirty grains may be necessary to check the sweating completely, the only inconvenience attending the administration of large doses being the great quantity of the powder. Patients, however, make no objection to the bitter taste, etc., when they find how much benefit they receive from its use. Dr. Wolfenden has administered it in nearly forty cases of phthisis with complete success. The only ill effects which have been noticed are, first, sickness, which stops on elimination of the dose; secondly, diarrhœa, which can be averted by combination with one or two grains of Dover's powder.—*Glasgow Med. Journal.*

Dr. Young uses a tincture and a crystalline principle obtained from agaricus. He confirms the above statements, and finds in addition that cough is relieved, sleep induced, and temperature lowered by the drug.—*Med. Times and Gazette; Louisv. Med. News*, May 27.

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AMYL NITRITE FOR AGUE.—Dr. Saunders, of Indore, India, reports in the "Indian Medical Gazette" a number of cases of ague successfully treated with amyl nitrite. He asserts that in every instance the disease yielded quickly and permanently to the amyl treatment. He mixes the drug with an equal volume of oil of coriander, to make it less volatile and to cover its odor, and administers it as follows: Four drops of the mixture are poured on a small piece of lint, which is given into the hands of the patient for him to inhale freely; he soon becomes flush, and both his pulse and respiration are much accelerated, and when he feels warm all over, the inhalation is discontinued, as the symptoms continue to increase for some time afterward; a profuse perspiration now sets in, which speedily ends the attack, though in some cases the cold stage merely passes off without any hot or sweating stage.—*Therapeutic Gazette; Cincinnati Lancet and Clinic*, April 8.

# PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

THE AMERICAN PHARMACEUTICAL ASSOCIATION will hold its thirtieth annual meeting at Niagara Falls, commencing September 12th. The meeting-room will be in the Cataract House, where will also be the headquarters of the Association. The exhibition will be in the pavilion, located in Prospect Park. The rates secured for the members at the hotels are $3 per day at the Cataract House, International Hotel, and Hotel Kaltenbach, $2.50 at the Goat Island Hotel, Spencer House and Rapids House, and $2 at the Niagara House. The Local Secretary, Mr. H. E. Griffith, has also secured very considerable reductions in the fees of admission to the different points of interest.

From a circular to be issued by the Committee on Entertainment we learn that no concessions in railroad rates can be secured from the main lines, except the regular excursion rates to and from Niagara Falls. Three excursions, commencing at Niagara Falls, passing through Lake Ontario and St. Lawrence River to Montreal and terminating at New York, have been laid out by the committee, and will start after the adjournment of the Association, as follows:

1. Returning *via* lakes Champlain and George, Saratoga and Hudson River; rate, $25.

2. Returning *via* Mount Washington, Profile House, Boston, and Long Island Sound; rate, $41.50.

3. Like No. 2, but including Quebec; rate, $43.50

A very elaborate programme has been laid out for the entertainments at Niagara Falls, comprising instrumental music during the week, an instrumental and vocal concert on Tuesday evening, dancing on Wednesday evening, banquet on Thursday evening, and during the afternoons excursions to various places of interest. The price of tickets admitting to these entertainments will be to gentlemen $5, and to ladies $2.50. Members remitting to the chairman of the committee, Geo. J. Seabury, New York, in advance of the meeting, the price of entertainment tickets, will find apartments ready on arrival and in charge of the Bureau of Information, which the committee has organized, to remain at the Cataract House during the week of the meeting.

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CINCINNATI COLLEGE OF PHARMACY.—At the meeting held July 13th Messrs. Julius Greyer, F. Serodino, F. A. Kautz and Chas. P. Fennel were elected members of the Board of Trustees, and Messrs. G. Eger, J. H. Feemster, H. H. Koehnken, F. A. Kautz and J. Greyer delegates to the next meeting of the American Pharmaceutical Association.

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THE KENTUCKY STATE PHARMACEUTICAL ASSOCIATION held its fifth annual meeting in the city of Covington, May 17 and 18. Mr. Zwick delivered the welcoming address. The various officers and committees presented reports, from which it appears that the legislature failed to extend the provisions of the Pharmacy law to the entire State, and also refused to grant the Association a charter of incorporation.

The following officers were elected to serve for the ensuing year: President, G. A. Zwick, of Covington; Vice Presidents—G. Holzhauer, of Newport; Samuel Curry, of Danville; H. Megill, of Owensboro; Recording Secretary, Mr. Elwang, of Louisville; Corresponding Secretary, Mr. McDowal, of Eminence; Treasurer, P. Nodler, of Covington.

The various standing and several special committees were appointed, and after finishing the busiuess before it the Associaton adjourned to meet next year at Eminence.

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THE TEXAS PHARMACEUTICAL ASSOCIATION held its fourth annual meeting in Fort Worth, May 9th and 10th, the Second Vice President, Leo Preuss, of Eunis, presiding. The Secretary read the annual address, containing valuable suggestions for the future welfare of the Association. Among the business transacted was the application for a charter and the election of a Committee of Trustees. The following officers were elected to serve for one year: President, E. M Wells, Fort Worth; Vice Presidents—W. J. Morley, of Austin; T. W. Powell, of Fort Worth; and C. F. Hall, of Bryan; Treasurer, E. W. Lancaster, of Marshall; Secretary, W. H. Murdock, of Dallas. The next meeting will be held in Austin, the capital, on the second Tuesday of May, 1883.

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THE NEBRASKA PHARMACEUTICAL ASSOCIATION was organized in the Board of Trade rooms in the city of Lincoln, June 21. Dr. Park, of Ashland, was elected temporary chairman and Mr. Whittlesey, of Crete, secretary *pro temp.* The object of the movement was fully explained by Mr. Goodman, of Omaha, and a committee on permanent organization was appointed, which reported at the evening session the constitution and by-laws of the Iowa Association, and these, somewhat amended, were adopted. The officers chosen are: President, E. M. Park, Ashland; Vice Presidents—M. Parr, Omaha; A. D. Wykoff, York; M. Padden, Alexandria; Jas. Reed, Nebraska City; and H. E. Wells, Juniata; Secretary, J. W. Bell, Omaha; Assistant Secretary, W. C. Lane, Lincoln; Treasurer, C. M. Leighton, Lincoln. Various committees were appointed, also delegates to the National Association, and on June 22 the meeting closed and the Association adjourned to meet again at Lincoln on the second Tuesday of June, 1883.

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## EDITORIAL DEPARTMENT.

COUNTY PHARMACEUTICAL ASSOCIATIONS.—The Pennsylvania Pharmaceutical Association, recognizing the importance of united action for the development of a higher standard in the practice of pharmacy, has appointed a committee for furthering the organization of new county societies, and this committee has issued a circular which is accompanied, as a guide or aid toward the end in view, by a copy of the constitution and by-laws adopted by the Lancaster County Pharmaceutical Association, recently organized.

A preliminary gathering of the druggists of the county, called by a few druggists who felt an interest in the formation of a county organization, was first made. Afterwards a permanent organization was effected, which now promises to be a source of pleasure and benefit to all engaged.

We sincerely hope that these efforts will meet the deserved success, and that at the next meeting of the Pennsylvania Pharmaceutical Association many counties of the State will be represented by delegations. The committee consists of Messrs. Charles A. Heinitsh, Lancaster; Geo. W. Kennedy, Pottsville; Edw. T. Myers, Bethlehem; Edw. A. Cornell, Williamsport; Geo. W. Kessler, Altoona.

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LIQUOR SELLING BY PHARMACISTS.—The Iowa pharmacy law provides that registered pharmacists and "apothecaries . . . shall have the right to keep and sell, under such restrictions as herein provided, all medicines and poisons authorized by the National, American or United States Dispensatory or Pharmacopœia as of recognized medicinal utility." It is, however, further provided it shall not be "lawful for any licensed or registered druggist or pharmacist to retail or sell or give away any alcoholic liquors or compounds as a beverage."

A physician and registered pharmacist of Searsboro sold, last year, a pint of whisky to a man, who stated that he needed it for medicine, and that he was accustomed to taking it. The physician and druggist was prosecuted before a justice of the peace and fined $100. The case was removed to the District Court, and finally to the Supreme Court, which tribunal, on March 22d, affirmed the judgment, holding that, in selling liquors, the druggist must act in good faith, and that, while in form sold as a medicine, it was, in fact, a beverage, and so understood by both buyer and seller.

At the April term the same court rendered a decision holding that the law for the suppression of the unlawful sale of intoxicating liquors was not repealed by the Iowa pharmacy act, except possibly so far as was necessary to allow sales by registered apothecaries of intoxicating liquors for medicine.

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ARTIFICIAL CURARE.— Mr. Rabuteau exhibited at a meeting of the Paris Biological Society, held February 25th, a chemical compound which is stated to possess physiological properties closely analogous to those of curare. This compound is the *iodide of methyl-triethyl-stibonium*, $Sb.C_2H_5)_3(CH_3)I$, and is a white crystallizable salt, soluble in water and in alcohol, and having a bitter taste.

The stibethyl compounds were investigated by C. Loewig and E. Schweizer in 1850, those of ethylstibonium by R. Loewig in 1855, and the compounds of stibmethyl and methyl-stibonium by H. Landolt in 1851; their soluble salts have a bitter taste.

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ARTIFICIAL QUININE.—A few months ago Mr. Maumené exhibited before the French Academy of Sciences an artificial product stated to possess the chemical properties of quinine, and that physiological experiments

with the new substance were being made. Nothing more has since been learned of the compound, or the process by which it was obtained.

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CINCHONAS IN GUATEMALA.—We learn from the daily papers that the Guatemalan government has paid Sarg Brothers, English planters in the Coban district, a premium of $1,500 for the successful acclimatization of 2,500 cinchona plants from Peru.

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PROFESSOR J. E. DE VRIJ, the celebrated Dutch quinologist, obtained his diploma in pharmacy June 6, 1832. On the semi-centennial anniversary thereof he received from the King of Holland the order of Knight of the Dutch Lion, and was presented, in the name of the pharmacists of the Netherlands, with a silver statue of Hippocrates, placed upon a marble base, to which was attached a medal representing the goddess Insulinda leaning against a red cinchona tree; this was accompanied by a costly album, containing an address and the signatures of 322 pharmacists of the Netherlands.

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## REVIEWS AND BIBLIOGRAPHICAL NOTICES.

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*Proceedings of the Indiana Pharmaceutical Association* at the Meetings held in the Masonic Temple, Indianapolis, May 9 and 10, 1882, etc. 8vo, pp. 58.

A report of the meeting will be found on p. 326 of our June number.

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*Eighteenth Annual Report of the Alumni Association for the Year* 1881-82, with the Exercises of the Sixty-first Annual Commencement of the Philadelphia College of Pharmacy. 8vo, pp. 141.

As usual, this report contains the introductory and valedictory addresses, and minutes of the business and social meetings of the association, the proceedings of the latter being reported in full by a stenographer. The pamphlet may be obtained from the Secretary, Wm. E. Krewson, Ph.G.

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*Practical Medical Anatomy.* By Ambrose L. Ranney, A.M., M.D., Adjunct Professor of Anatomy in the Medical Department of the University of the City of New York, etc. New York: Wm. Wood & Co., 1882. 8vo, pp. 339.

This volume, which forms the sixth of the present series of Wood's Library of Standard Medical Authors, is designed to be a guide to the physician in the study of the relations of the viscera to each other in health and disease, and in the diagnosis of the medical and surgical condition of the anatomical structures of the head and trunk. It contains over 155 woodcuts.

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*The Druggist's Annual for* 1882. Compiled by H. G. Adam. New York: Root & Tinker. 8vo, pp. 151.

Intended as a book of reference, this volume contains a large amount of information, valuable to the wholesale dealer, but also much that is of

value to the pharmacist. Statistical tables of importation and exportation, average prices of important articles, statistics of production and trade of various staple products—all these, covering several years, will be found of much interest, as will also the list of duties on imported goods, the average weight or size of original packages, etc. Tables referring to dispensing facilities and to laboratory work, etc., will be found useful in practice. The list of pharmaceutical associations and their officers is quite incomplete. Nearly one-half of the book consists of an exposition of the patents granted in the drug, chemical, oil, paint and allied trades in 1881.

The absence of an index interferes with the ready consulting of the contents, for which no systematic arrangement has been attempted.

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*Brett's Auckland Almanac, Provincial Handbook and Strangers' Vade Mecum for* 1882. Auckland: H. Brett. 8vo, pp. 176.

An interesting book, giving a vast amount of information on agriculture, commerce and other industries of Auckland, New Zealand and the other Australasian colonies of Great Britain.

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*Transactions of the Medical Association of Georgia.* Thirty-second Annual Session, 1881. Augusta, Ga. 8vo, pp. 314.

This volume is handsomely gotten up; the types are large and clear, the paper and printing are good, and the various reports and papers are of general professional interest. About one-fourth of the volume is occupied with mostly brief biographies of deceased members, those of Drs. R. Irvine and Crawford W. Long being accompanied by portraits. For the latter is claimed the honor of having discovered the anæsthetic properties of ether, he having performed surgical operations on March 30, and June 6, 1842, while the patients were under the influence of this anæsthetic.

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*Ein Gliom.* Von Dr. Heinrich Tiedemann, Philadelphia. 8vo, pp. 16.

A glioma.—The pamphlet is dedicated to Dr. von Bischoff, of Munich, on the fiftieth anniversary of his doctorate.

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*The Metric System of Weights and Measures, adopteed by the U. S. Marine Hospital Service.* Ann Arbor: John Moore. 24mo, pp. 44.

A reprint of the tables prepared four or five years ago by Prof. Oldberg.

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*Report on Ophthalmology, made to the Medical and Chirurgical Faculty of Maryland,* April, 1882. By J. J. Chisolm, M.D., Professor, etc. 8vo, pp. 15.

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*Thirty-ninth Annual Report of the Managers of the State Lunatic Asylum, Utica, N. Y., for the year* 1881. Transmitted to the Legislature Jan. 13, 1882. 8vo, pp. 42.

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*Fourteenth Annual Report of the President of the Inebriates' Home, Fort Hamilton, N. Y., for the Year* 1881. Also, a Statistical Report of Six Hundred Cases of Alcoholic Inebriety Treated at the Home from Nov. 1, 1879, to Jan. 1, 1881. By Lewis D. Mason, M.D., Consulting Physician. 8vo, pp. 27.